

August 15, 2002

PLASTICS WHITE PAPER

Volume I Executive Summary

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*Optimizing
Plastics Use,
Recycling, and
Disposal in
California*

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Volume I Executive Summary

*Optimizing Plastics Use, Recycling,
and Disposal in California*

Prepared for:



California Integrated
Waste Management Board



California Department
of Conservation

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Why a Plastics White Paper?
Why are California Plastic Policies Not Working?
What Should the State Do About Plastics?

Volume 2. Polystyrene Plastics Report

SB 1127 Polystyrene Status Report

Volume 3. Background of White Paper and Workshop

White Paper Background and Workshop Support Materials, 2002
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Why a Plastics White Paper?



Why a Plastics White Paper?

1

The California Integrated Waste Management Board (CIWMB), and the California Department of Conservation (DOC), commissioned this independent plastics white paper in order to help define current California plastic issues, and explore a menu of future policy options for the State. The State of California is interested in increasing plastic recycling rates and the use of recycled plastics, and promoting plastics resource conservation.

Why are plastics targeted for this effort when there are other materials that make up a larger share of California's waste stream? Plastics have drawn both strong positive, and strong negative, attention in its relatively short history. Examining reasons behind this attention helps explain why some have begun to focus on new plastic policies, and helps illuminate potential policy directions for the State so as to optimize use, recycling, and disposal of this ubiquitous material.

Plastics Use is Proliferating and for Good Reasons

Since the 1950's, plastics have grown into a major industry that positively affect all of our lives. Plastics contribute to our health, safety, and piece of mind in endless beneficial ways. Plastics unique characteristics (lightweight, durability, and formability) enable the material to be used in products that grace our lives on a daily basis ranging from coffee cups to automobiles.

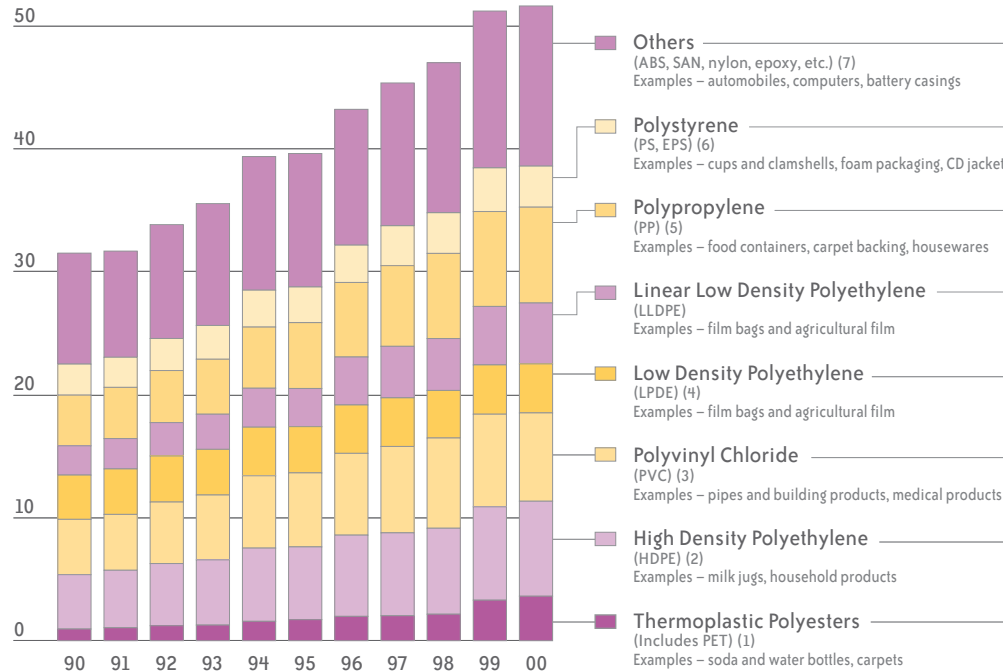
Beginning in the early 1900's, developments in the plastics industry have included such innovative new materials as Bakelite (1907), cellophane (1913), polyvinyl chloride (1926), polyethylene (1926), nylon stockings (1939), and Velcro (1957). These products were the start of a plastics revolution that continues today. In less than one hundred years, plastics have gone from a novelty specialty material, developed in kitchen laboratories, to an all pervasive, multi-billion dollar industry.

Today, plastics are widespread in packaging, furniture, appliances, automobiles, buildings, medical equipment, toys, and a wide variety of industrial and consumer goods. Advances in barriers, colors, and resins are further expanding the applications of plastics, and new patents are regularly granted for plastic polymers and uses. A key advantage of plastics is that minor changes in chemical structures can result in significant changes in material characteristics, making plastics one of the most versatile materials.

Three members of the polyethylene family of plastics illustrate plastic's versatility. Polyethylene Terephthalate (PET) is clear, tough, provides a barrier to gas and moisture, and is heat-resistant. PET is used in drink bottles, injection-molded consumer products, as well as fiber applications. High Density Polyethylene (HDPE) is stiff, resistant to chemicals and moisture, but permeable to gas. HDPE is easy to process and mold, and is used in a wide range of products including bottles, tubs, and bags. Low Density Polyethylene (LDPE) is used predominantly in film applications because it is tough, flexible, and relatively transparent. Because of these properties, LDPE is also used in wire and cable applications.

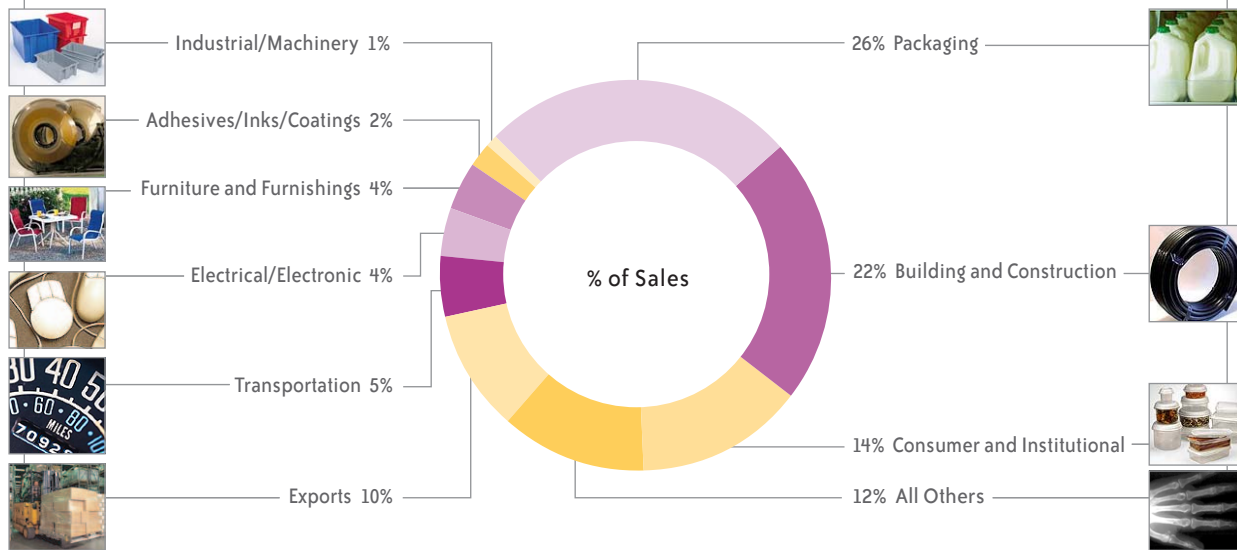
U.S. Plastic Resin Sales Continue to Grow

Million Tons per Year



Sources: 2, 3.

U.S. Plastic Resins are Used in a Wide Range of Beneficial Applications



Source: 2.

Plastics have grown into a major industry in both the United States and California. Nationwide, the plastics industry is fourth in shipments among manufacturing industry groups, accounting for more than \$330 billion in shipments for 2000. California is one of the top states, with \$27.6 billion in plastic industry shipments, and 146,900 jobs.¹ Nationally, production of plastics has grown at a rate of 4.9 percent per year since 1973, reaching sales of over 50 million tons in 2000.²

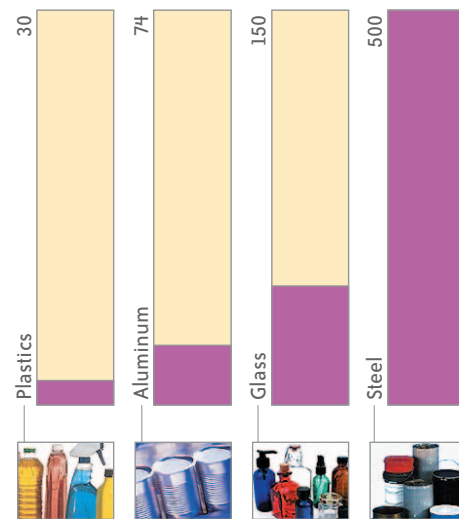
Manufacturers and consumers have widely embraced plastic products, ranging from plastic water bottles, to toys, to computers. The largest categories of plastic resin sales are packaging (26 percent), building and construction (22 percent), consumer and institutional (14 percent), exports (10 percent), and transportation (5 percent).² In automobiles and other transportation applications, plastic resins are both light and strong, allowing for vehicles with increased fuel efficiency. Plastics provide structural and insulating qualities in a wide range of building applications, including pipes, carpets, and insulation, flooring, and window frames.

In packaging, plastics offer significant source reduction benefits, reducing the amount of material needed to supply a product while maintaining the functions provided by

packaging. For example, a two-pound plastic bag of rice has a product-to-package ratio of 99 to 1, while a 28-ounce paperboard box of rice has a product-to-package ratio of 13 to 1. Delivering 1,000 pounds of rice in plastic bags generates only 3.9 pounds of waste, while delivering the same amount of rice in paperboard boxes

Plastics are a Low Density Material, Even as Compared to Light Weight Aluminum

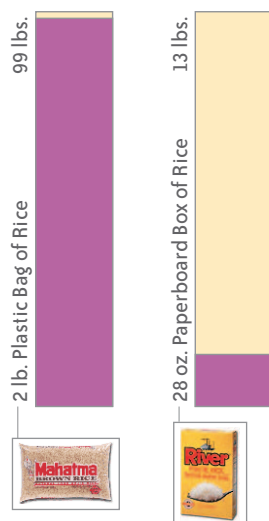
Pounds per Cubic Yard



Source: 5.

Plastics Have Tremendous Source Reduction Properties

Pounds of Product per Pound of Packaging



Source: 4.

generates 78.1 pounds of waste.⁴ Plastics packaging also has itself been source-reduced over the years with two-liter soda bottles and gallon milk jugs about 30 percent lighter today than they were in the early 1970s.

Plastics play a significant role in reducing the amount of waste ultimately sent to landfills. The weight reducing benefits of many plastics can offset the higher recycling rates of other materials. Plastics have greatly displaced many other materials in our economy over the last several decades, and if plastics were not used, there would have been an even greater mass of other materials to manage as the result of population and economic growth. However, the dilemma of plastics is that its strengths (versatility and utility in a wide range of applications,) are also in a sense its weakness, as its proliferation and heterogeneous characteristics make it challenging to manage as waste.

Life Cycle Material Analysis can be an Informative Tool but it Should Not Be Used for Policy Decisions

Life Cycle Analysis (LCA) is the technical “cradle-to-grave” analysis of the impacts of a product or material. A LCA consists of three parts, (1) an inventory of the impacts (raw materials acquisition, manufacture, processing, formulation, distribution and transportation, use, reuse, maintenance, recycling, and waste disposal). The inventory includes an analysis of the environmental burdens associated with the process or activity, for example quantifying the energy, raw materials usage, and emissions over the life of the product; (2) an impact analysis that characterizes and assesses the effects of chemical releases on human health and the environment, and (3) an improvement analysis to evaluate and implement modifications in the production process based on findings of the inventory and impact analysis.

The first LCA was conducted in 1969 by the Coca Cola Company to determine which type of containers were most environmentally sound. Since then, numerous LCA studies have been conducted worldwide. A number of organizations in the United States have conducted LCAs on products such as beverage containers, bags, diapers, and milk containers. The Society of Environmental Toxicology and Chemistry (SETAC) developed a standard methodology, and there are over 19 LCA methodologies used in Europe.

LCA is seen as a valuable tool for considering the different impacts across the life of a product or package, however, care is needed in interpreting results. LCA should not be relied on for setting public policy for several reasons.

One problem with LCA is the wide range of study results (often depending on who is funding them). For example, a 1988 NAPCOR study comparing soda containers found 2L PET and 12 oz aluminum better than refillable glass at existing trippage rates, found PET and aluminum equivalent on air emissions, found PET and refillable glass about equivalent on water emissions, and PET and refillable glass about equivalent on energy consumption. A 1976 study by the Federal Energy Administration evaluating energy consumption of soft drink containers ranked plastic bottles second behind refillable glass, but only assumed a 25 percent recycling rate for aluminum.

A 1974 study by Franklin Associates for the EPA ranked plastic bottles fourth in the amount of water needed to produce, package, and deliver a beverage to consumers. A 1991 study by Franklin Associates examined only the energy used to produce plastic packaging and disposable products as compared to alternatives from other materials. They quantified total energy use at each manufacturing stage and found that 336 million fewer Btu were required to produce plastic packaging than would have been required to produce the non-plastic alternatives. The majority of the savings (78 percent) were from energy-savings from the use of film as compared to alternatives such as kraft paper, wax paper, tissue, and foil. Savings were less significant, or even negative when comparing the energy use of disposable plastics such as cups, and plates to the alternatives.

Similarly, studies of milk delivery packaging in Europe and Canada found different container types ranked higher or lower. Rankings depended on what factors were evaluated and assumptions made about waste, sources of energy, and package design.

A second problem with LCA is that it does not take into account how the product or package is used. The actual use of the material may have more significant impacts, and wider variation in impacts, than how it was produced. For example, LCA studies assume that the container is discarded properly for recycling or disposal. If the container is littered and ends up in the storm drain, the potential negative impacts are much higher.

A third problem with LCA is that they quantify average impacts. Often, the variation behind the average impacts such, as emissions or energy use, are wide. Taking these into account could lead to entirely different conclusions about the “best” package or product.

A European packaging industry group states that the differences in LCA analyses between various packaging types are not significant – certainly not significant enough to base public policy decisions: “The difference on environmental grounds between one type of packaging and another is too small to be meaningful – often the difference between the same types of packaging produced in different plants is greater than the difference between types of packaging.”⁷

Packaging manufacturers and research groups should continue to use LCA to evaluate and compare packages and products to better understand their impacts and how to minimize them. LCA is not a tool that should be used as a basis to either justify or ban certain plastic materials.

Source: 6.

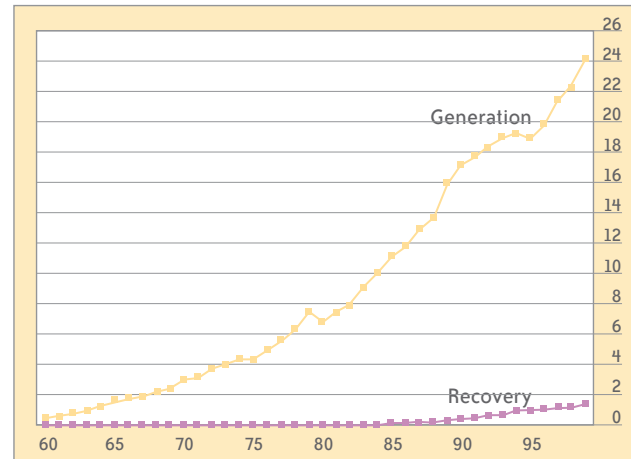
Plastics Disposal is Growing Fast and is Voluminous

As plastics are displacing heavier, less flexible materials in packaging, building, transportation, and disposable products, the amount of disposed plastics is increasing almost as rapidly as production levels. As a result, plastics in the municipal solid waste discard continue to grow, and are the fastest growing portion of the municipal waste stream. An amount of plastics equal to almost one-half the resin produced each year now ends up in landfills. Nationally, plastics in the municipal solid waste (MSW) discard increased from 0.5 percent (390,000 tons) in 1960, to 13.8 percent (22.8 million tons) in 1999, following a rapid growth in plastics generation.⁸

Plastics represent a disproportionate share of landfill space, and next to paper, are the second largest overall category of waste volume going into municipal landfills. In California, plastics represent 8.9 percent of the waste weight landfilled, an estimated 3.4 million tons in 2000. As light as it is, plastics are still the fifth largest category by total weight of material in California's landfills, behind paper, construction and demolition waste, food waste, and yard waste.⁹ Because of its light unit weight, plastic represents an even larger share of California's landfill volume – perhaps twice as high a percentage of volume as compared to weight (or almost 18 percent by volume).

The Long-Term Gap Between U.S. Plastics Generation and Recovery is Widening

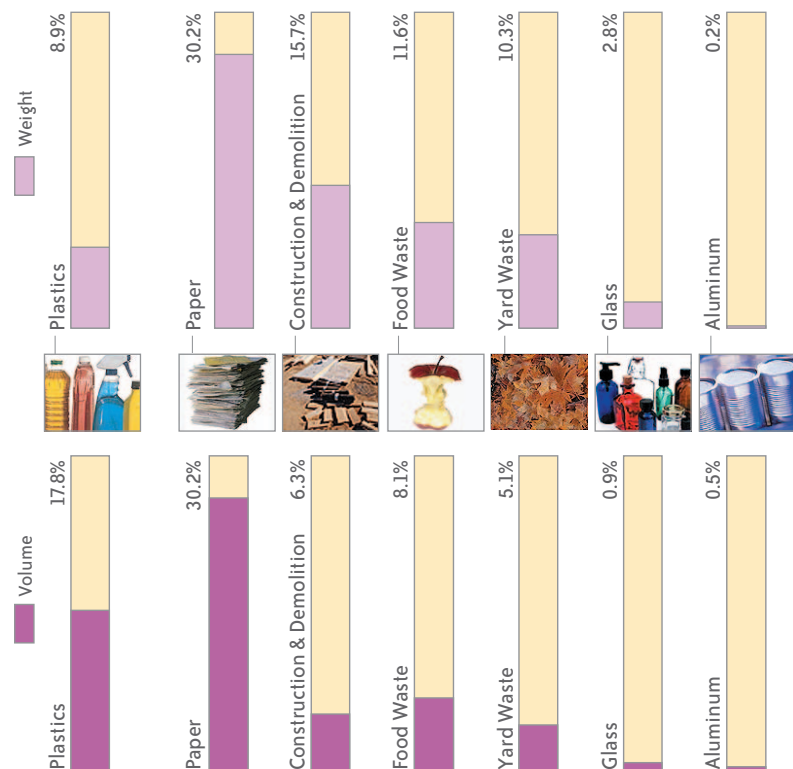
Million Tons per Year



Source: 8.

Plastics are Ranked 5th by Weight, but 2nd by Volume, in California's Landfills (1999)

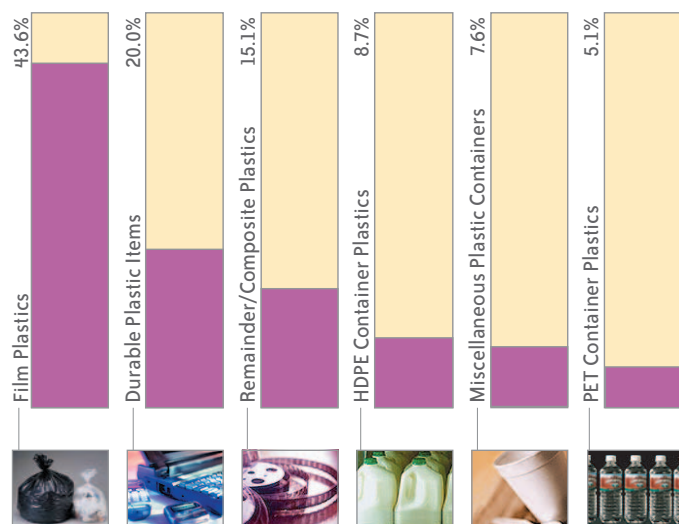
Percent of Disposed Waste



Sources: 9, 10, 11.

Film is the Largest Plastics Category (by Weight) in California's Landfills (1998)

Percent of Plastics Waste



Source: 9.

Plastics in California's landfills fall into six main categories, with film making up by far the largest share.⁹ The next largest single category of plastics is durable goods; however, the three container categories combined exceed durable goods by making up 21.4 percent of the plastics waste stream in California. Solid waste officials sometimes complain that when they look at a landfill what they see is a sea of plastics, and primarily film plastics.

compared with recycling of other material types, and plastic's relatively lower recycling rates, the plastic recycling gains are disappointingly slow. The result is frustration from the plastics industry that their efforts to boost recycling (as well as promote the source reduction benefits of plastic) are not adequately recognized, and frustration from environmental groups and local governments that plastics recycling is difficult and expensive, and has inadequate markets. Challenging plastics further, bottle-to-bottle plastics recycling, until very recently, has been miniscule compared to other secondary material closed-loop recycling.

Plastics Recycling is Lagging and it is Expensive

Plastics production continues to far outpace plastics recycling, and plastics are displacing some other more recyclable materials. Waste management systems have not been able to keep pace with the rapid increase in plastics use, which has garnered the attention of environmental groups and government policymakers, resulting in a patchwork of legislative attempts to manage plastics.

Plastics recycling, starting from its infancy in the 1970s is now an established industry. Considering that there really was not a plastics recycling infrastructure before the 1970s, plastic recycling gains have been impressive. However, when

There are Opportunities to Expand Film Collection and Recycling in California

Film plastics are used in a wide range of applications, from food packaging to agricultural mulch film. It is difficult to obtain a clear picture of film production from existing data on film plastics production. From American Plastics Council (APC) figures, an estimated 5.9 million tons were produced nationwide in 1999 from the major film resin types, LDPE, LLDPE, HDPE, PP, and PVC (data for film from other resins is not available). Extrapolating downwards to California, this is an estimated 591,350 tons of plastic film produced for California sales in 1999. This sales estimate, however, is not consistent with waste disposal data for California, which shows that 1.38 million tons of film plastics were disposed. Of this 1.38 million tons, 56 percent (772,721 tons) is from commercial and industrial sources and 41 percent (570,893 tons) is from residential sources. The remaining 3 percent of film disposed in California was from self-haul waste.

There are Opportunities to Expand Film Collection and Recycling in California *(continued)*

The Statewide Waste Characterization Study found eight industry categories that disposed of significantly larger quantities of film than the statewide average. These broad categories could be targeted for increased film collection.

Industry Category	Percent Film in Total Waste Disposed	SIC Codes
1. Manufacturing, Food/Kindred	12.5 %	20
2. Transportation, Other	8.5	40,41,44,46,47
3. Manufacturing, Electronic Equipment	8.5	36
4. Combined Categories (includes Agriculture, some Manufacturing)	8.4	Several
5. Wholesale Trade, Nondurable goods	8.0	51
6. Retail Trade, Food Store	7.1	54
7. Manufacturing, Industrial/Machinery	6.5	35
8. Services, Business Services	6.4	73

Markets for clean plastic film have existed in California for several decades. According to industry experts, at least 80 percent of the clean film generated statewide by larger sources (large retailers and industry), is already being collected and either used in products or exported. Plastic film end-users, processors, and exporters say they could all use more clean film, if it were available.

Over the last few years, the biggest new market for plastic film, primarily polyethylene, has been composite lumber. Manufacturers, such as Trex and Boise-Cascade (Marathon Recovery), are producing decking, siding, and other products using a mix of plastic and wood (typically sawdust). These markets have less stringent quality standards than for closed-loop film applications such as trash bags, and thus can be less selective in the materials accepted. Composite lumber manufacturers are competing among each other for recycled plastic film by setting up milk-run collections and collection systems within larger retailers such as Safeway, Albertsons, and Vons. Many large retailers and manufacturers already have collection systems in place for clean film, although statewide numbers are not available.

The State could further support existing film collection by expanding publicity and education about plastic bag take-back programs. Many large retailers accept plastic bags for return, which are then collected and back-hauled back to distribution centers and combined with stretch and other film for composite lumber. Keeping the recycled film separate from other materials is important. Once film has been combined with other recycled materials, or put in joint collection bins, the material is almost always contaminated, and is difficult and expensive to clean and use.

There are two key areas where film recycling could be increased. The first is agricultural film, and the second is the smaller retail and distribution industries that are not currently large enough now to have economically viable collection systems in place.

Agricultural film, including fumigation films, mulch film, greenhouse film, and irrigation drip tape, is generated seasonally in California. Disposal of this material is becoming increasingly difficult for farmers, and some landfills will not accept the material. Farmers are looking to their film suppliers to help provide disposal or recycling services for the material. This is an area where State support could be beneficial, especially in permitting and siting facilities to clean and process agricultural film. Collection of agricultural film is relatively straightforward, as there are systems in place to apply and remove film. Agricultural films may be contaminated with dirt or pesticides, so cleaning systems are necessary to make these films suitable for most uses (although conversion and some other technologies might be able to use contaminated film).

The second key untapped area for film recovery is retailers and manufacturers. Medium and small operations do not currently generate enough clean film to make collection efficient either for them or end-users such as the plastic/composite lumber industry. Thus, there is little incentive to establish collection programs like those that are in place for the larger generators.

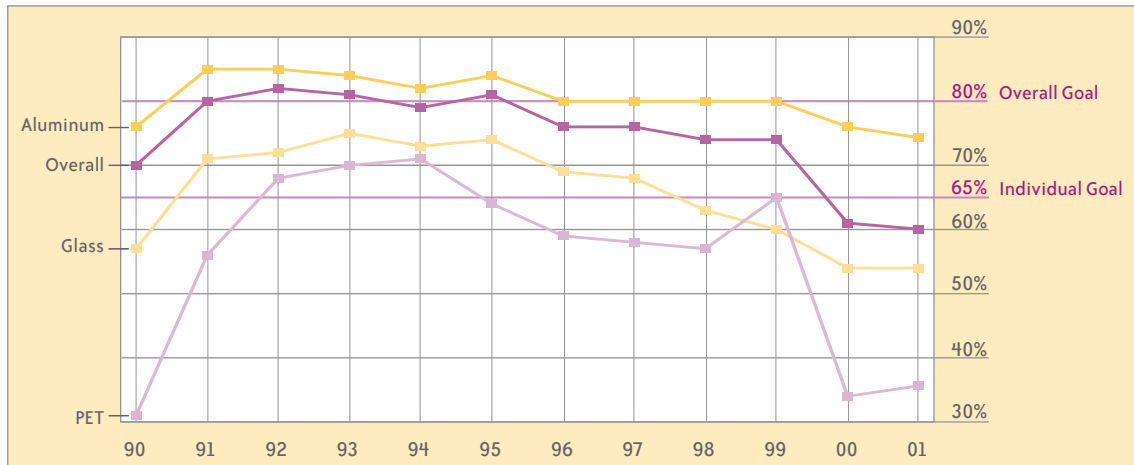
While each location may generate a relatively small amount of film, cumulatively, the statewide total could be significant. Further State assessment of the potential of collection systems, milk-runs, or backhaul systems within this industry segment could lead to diversion of more film statewide. The Alameda County Waste Management Authority is supporting plastics film collection among smaller generators in a program that could be modeled statewide.

A third category of film generation is household film. Over 40 percent of film disposed statewide is from residential sources. This film is typically dirty – and consists of a wide variety of films, ranging from chicken wrappers to plastic bags. Until general household and yard waste biodegradable plastics and composting facilities are commercially available, diversion of conventional film plastics may be limited to conversion or other technologies that do not require cleaning or sorting. Once new technologies are in place, curbside programs or local drop-off programs could provide residential plastic film collection, for either conventional or biodegradable film plastics.

Like other plastics, the key to conventional plastic film recycling is quantity and quality. The first tier of large quantity and high quality film is already being collected and used in products. If the State wants to divert more film from landfills, it must begin to look at the next levels of film collection. Agricultural film has high quantity but is dirty, while smaller retailers and manufacturers have smaller quantities of clean material. Recycling film plastic from both of these categories will provide challenges, but by working with the involved parties to promote appropriate collection and/or cleaning, effective systems can be put in place to tap into these markets, diverting significant quantities of conventional film plastics.

Plastic Beverage Containers (PET) Generally Have the Lowest Recycling Rates of All California Beverage Containers

Percent Recycled



Source: 16.

Most recycled plastics are PET and HDPE containers, accounting for just over one-half of national plastics recycling in the last few years.^{8,15} Other categories of plastics that are recycled in significant quantities are polypropylene battery casings; HDPE, LDPE, LLDPE stretch wrap and film; PET X-ray films; and polystyrene protective packaging. There are over 1,800 recycling centers in California collecting plastics, 528 curbside programs, 241 processors, and 8 reclaimers. Nationally, there are almost 60 plastic reclaimers, and capacity for recycled plastic bottles exceeds supply.

Plastics recycling in California, predominantly PET and HDPE beverage containers recycled under the State's beverage container recycling program, have increased exponentially, from 26.4 million containers in 1988, to 1.6 billion containers in 2001 – a 60-fold increase.¹⁶ Recycling rates for PET beverage containers peaked in 1994, at 71 percent. In recent years, with the addition of new containers to the program, the PET beverage container recycling rate has dropped to 36 percent. There is hope that plastic beverage container recycling rates will increase in a few years, once consumers and recyclers have assimilated all the new beverage containers incorporated into the AB 2020 program in 2000.

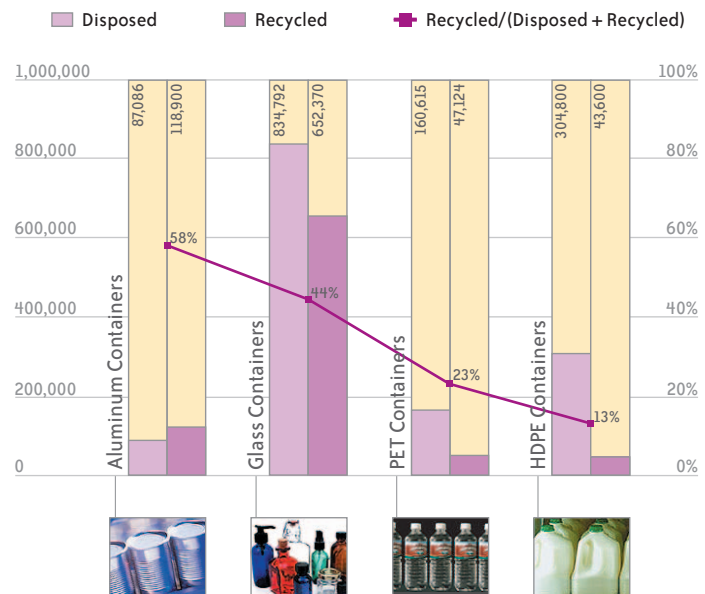
Plastic bottle sales are increasing so rapidly that recycling rates simply cannot keep pace. For example, bottled water sales – a PET bottle market that was virtually nonexistent 25 years ago – have been increasing at an annual rate of between 8 and 12 percent per year for the last several years, and bottled water is on track to become the second largest category of beverages sold, behind soft drinks, by 2005.

The addition of new beverages, including bottled water, to California's beverage container program in 2000, more than doubled the number of PET containers in the program, and from 1999 to 2001, the number of PET beverage containers sold in the State more than tripled. While the number of PET beverage containers recycled increased by about 300 million each of the last two years, PET recycling rates dropped from 65 percent in 1999, to 34 percent in 2000. PET recycling rates appear to be turning upward, increasing to 36 percent in 2001.¹⁶

Overall, the plastics recycling rate has stagnated at a low level and plastics recycling quantities and rates remain lower than other materials, such as steel, aluminum, glass, and paper. Comparing CIWMB figures for what is in California's landfills, and DOC figures for how much is recycled, plastics beverage container recycling in California does not compare well with other material types. Aluminum is the only material for which more is recycled than disposed. Glass has a higher recycling rate than plastics, and only a little more is disposed than recycled, although there is currently greater demand for recycled glass than supply. For both PET and HDPE beverage container plastics, much more material is disposed than recycled.

More California Plastic Beverage Containers are Disposed versus Recycled, and more so than Other Material Types (2000)

Tons Disposed and Recycled and Recycled/(Disposed + Recycled)



Sources: 9, 17.

Nationwide, plastic packaging resin sales are increasing about four times faster than plastics packaging (i.e. bottle) recycling. Since 1995, U.S. plastics packaging resin sales (millions of pounds) increased at an annual average rate of 5.9 percent, while plastic bottles recycled (the majority of plastic packaging recycled) increased at an annual average rate of 3.4 percent.^{2,3,15} This is an increase in packaging resin sales of approximately 200 million pounds, and an increase in recycling of about 50 million pounds each year.

As with PET bottles in California, while the amount of plastics recycled are increasing, recycling rates nationally are not able to keep up with the rapid growth in sales. After a relatively large increase in plastic recycling rates from the mid 1980s to the mid 1990s, the total percent of plastics recycled from the U.S. waste stream has been relatively stable, at just over five percent.⁸ The total percent of all materials recycled in the waste stream has followed a similar pattern, but is stabilizing at a much higher 28 percent.

Recycling nationwide and in California, in general, has declined. A July 9, 2002, *Wall Street Journal* (WSJ) article pointed out that for the first time in almost 20 years, the U.S. aluminum recycling rate is less than 50 percent, and even in bottle bill states, recycling is dropping off.¹⁸ California's aluminum beverage container recycling rate is down to 75 percent, a drop from 80 percent two years ago. The WSJ article blames the economy, people's lack of time, and our on-the-go lifestyle for declining recycling. If aluminum, which is the most economically recyclable material, is now struggling concerning recycling, the recycling picture is not good for plastics.

New York City just terminated their plastic and glass recycling programs because of the costs of these programs. California has a unique bottle bill program with strong public support, and perhaps a more environmentally conscious public than nationwide, but increasing recycling, especially plastics recycling, will not be easy in California.

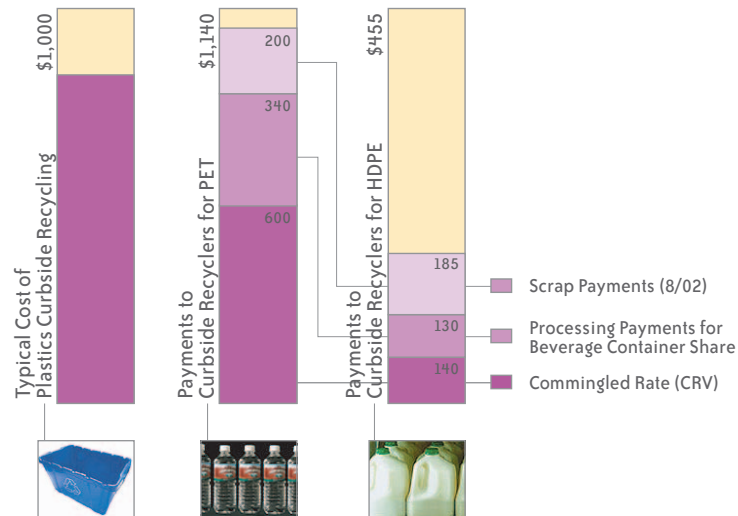
Plastics historically have been uneconomical to recycle with average collection and processing costs exceeding scrap values by more than two and one-half times without AB 2020 subsidies. Plastics are generally not as economic to recycle as other material types, and plastic recycling costs could increase further due to the proliferation of plastic container types. Higher plastic recycling rates come at a high economic cost, and higher than that for other material types.

Because plastics are lightweight, and multiple plastic resin types require sorting, the costs of recycling plastics can be several times higher than scrap prices paid to recyclers. California has helped close this gap for

beverage container recycling with the processing fee – recyclers are essentially paid an additional \$470 per ton for PET plastic beverage containers in processing fees to cover the difference between their recycling costs and the scrap prices they receive. This money currently comes primarily from unredeemed beverage deposits, and, to a lesser extent, from plastic container manufacturers. For non-beverage container plastics, there is no AB 2020 subsidy safety net, and the costs of recycling are high, often exceeding scrap values by several times.

AB 2020 Supports Plastics Recycling in California and Without AB 2020 Payments, the Costs of Plastics Recycling are much Higher than the Scrap Values of Most Plastics

Dollars per Ton



Sources: 17, 19, 20, 21, 22.

Obtaining a sufficient quantity and quality of plastic materials is absolutely necessary for cost-effective recycling programs. Without sufficient quantities of plastic materials that can be collected, sorted, and cleaned at a reasonable cost, there is little incentive to recycle. On the one hand, plastics collection must be efficient, and on the other hand buyers must be willing to pay an amount at least equivalent to what the recycler spent to collect the material. The reality often lies somewhere in the middle. End-markets for some plastics often will not pay enough to make it worthwhile to the recycler to collect and process the material to the quality standard they need. To complicate the system further, manufacturers are adding new plastic resin types, barriers, and colors; importers are bringing in plastic containers in less recyclable resins such as PVC; and the costs of plastic recycling rises.

Why Recycle Plastics?

While the direct economic costs for most all recycling are high, there are broader environmental, economic, and social benefits to recycling that are not typically valued. Recycling can offer distinct advantages over disposal of materials, in both environmental and economic arenas.

Recycling plastics reduces the amount of natural resources extracted (natural gas and oil in particular). Over 95 percent of the total energy required to produce one kilogram of plastics is due to extraction and refining. Avoiding these steps by recycling can result in energy savings.

The U.S. EPA estimates that energy savings from recycling, rather than landfilling, four kinds of plastics ranges from 19 to 24 million BTU's per ton of plastics recycled, equivalent to about 150 to 200 gallons of gasoline per ton of plastics recycled.²³ In addition to energy savings, studies have found reductions in air and water emissions from recycling rather than virgin material production.

Recycling also creates jobs. Two recent studies on the economic impacts of disposal and recycling in California found that diversion (recycling or reuse) results in an average of 212 percent increase in sales and public outlays as compared to disposal, a 165 percent increase in income, a 177 percent increase in value-added production, and a 190 percent increase in jobs.²⁴ Diversion creates 4.7 jobs per 1,000 tons, while disposal creates 2.5 jobs per 1,000 tons.

Plastic Markets are Dynamic, Limited, and Volatile

Plastics are a global commodity, subject to volatility of world economic forces. California is dependent on the plastics export market. While the California domestic market could absorb more recycled plastics material, often times the export market pays a higher price for recycled plastics.

A goal of some existing California plastic laws is to create markets for recycled resins. Unfortunately, plastic market drivers, in most cases, go far beyond California's reach. Also, there are three primary factors influencing virgin resin prices, which in turn influence the price manufacturers are willing to pay for recycled resins: (1) the price of natural gas and petroleum, (2) available virgin resin production capacity relative to demand, and (3) general economic conditions.

There is often a disconnect between supply and demand of recycled plastics. If a plastics material is to be collected for recycling, there must be viable markets. If there are to be viable markets, there must be a sufficient quantity and quality of recycled material available for purchase at a reasonable price. Again, this often leaves a gap, and as a result, some plastics that are collected for recycling may end up in the landfill. Recyclers complain that there are not adequate markets for some of the plastic materials they are collecting, and manufacturers complain that there are not enough high quality recycled plastics to meet their needs.

Quality of the recycled plastics material as compared to virgin grades is an issue that affects markets. Plastics are more difficult to clean than other recycled materials because of their low melting temperature, so contaminants such as other resin grades (especially PVC), colors, grit, dirt, labels, residues, and metals require extensive sorting and cleaning, and if not removed, reduce the value of recycled plastics. The impact of plastic packaging innovations such as barriers,

tints, and expanding single-serve container markets, increase the costs of sorting plastics and reduce the market price of recycled plastics. Virgin resin prices are generally low, and if virgin resin, even of a low grade, is available for a similar price, there is often little incentive to use potentially contaminated recycled plastics material.

Much of the plastics collected for recycling in California are exported to Pacific rim countries, often generating a slightly higher price than elsewhere in the United States. In 2001, the majority of PET plastics, almost all the injection grade and resin types # 3 to # 7 plastics, and about one-half of the HDPE collected in California were exported.²⁵ This high reliance on plastic export markets is a concern because export markets are inherently unstable, and Asia's demand for California's recycled plastic may not last. China is increasing production of virgin PET plastics, and it is beginning to ship more PET products to the U.S., reducing their demand for recycled resin.

Like the plastics industry itself, plastic recycling technologies and markets are continuously evolving, and viable new recycled plastic markets of any kind should be encouraged. A prime example is the current market for plastics film through composite lumber producers such as Trex and U.S. Plastic Lumber. This relatively new industry segment is collecting large quantities of plastics film, often of relatively low quality, for use in composite lumber products. Recycling plastics from automobile shredder residue, to be used again in automobiles, is another potential growth area in recycled plastics with a ready market.

There are exciting advances in the use of recycled plastics in bottle-to-bottle applications, both in HDPE and PET bottles. Both Coca-Cola and Pepsi have recently committed to using 10 percent post-consumer resin in the production of soda bottles by 2005. These companies currently use recycled resin in some products, and their expanded use will help spur domestic markets for recycled PET plastics. Pepsi President and CEO, Gary Rodden, commented to bottlers on the new policy: “We currently use recycled content in both aluminum and glass containers, so it makes sense that we explore the potential of using recycled content in our growing line of plastic bottles. ... We know that it is technically and economically feasible to produce a food-grade container made with 10 percent recycled content, so we believe achieving that rate is a reasonable action.”²⁶

There is still concern about potential contamination from the use of some post-consumer recycled (PCR) plastics in food contact applications. While this may be relevant for some other plastic resins, recycled PET plastics use in food and beverage applications is a big potential growth area for PET plastics.

What is often considered the “top” of the recycling hierarchy is closed-loop, or bottle-to-bottle recycling. The perceived advantage of closed-loop recycling is that the used bottle goes back into the creation of a new bottle, and the cycle continues indefinitely, reducing the total amount of new resins going into single-use products.

Open-loop recycling is typically the most common

approach for plastics. In this case, the recycled bottles are used to create new products, such as fiber, plastics lumber, computer components, furniture, buckets, bins, drainage pipes, video cassettes, and carpet. These products are typically not recycled, so some argue that open-loop recycling does not keep material out of the landfill as effectively. Because many open-loop products take years to reach the landfill, the end result of either plastics recycling approach can be positive from a resource conservation perspective. An advantage of closed-loop recycling in current markets though is that the higher quality bottle-grade recycled resin demands a higher scrap price than other uses, helping to close the gap between the costs of collecting and recycling plastics, and the price paid for the material.

Plastics Use Has Significant Unintended Consequences We Have Not Fully Recognized

The rapid growth of plastics use has had a cumulative down side. Not only are plastics in a lot of good uses, they are also everywhere else – in waterways, beaches, roadsides, and parks. Even at some landfills, plastics may be blowing around in the wind.

The plastics litter problem is becoming increasingly difficult to manage, and has costly negative implications for tourism, wildlife, aesthetics, boating, and most recently in California, public storm drain systems. The unintended consequences of plastics use is resulting in high social and economic costs – externalities – that are born by society and government in general, not by those directly responsible for the original plastics usage.

Litter is a pervasive problem involving diffuse sources and human behavior, and there are no easy solutions. It is argued that litter is not a problem caused by specific materials, such as plastics, but rather it is caused by human behavior. The argument here is that attributing the litter issue to one particular packaging material does not solve the litter problem because another type of packaging will take its place as litter unless behavior changes. However, plastic policies still need to address the issue of plastics litter entering the environment as litter and plastics are fast becoming synonymous.

Litter is obviously not a plastics problem alone, and the fact

that litter has been a public concern for decades points to the general difficulty in addressing this policy issue. However, plastics are a large component of litter, and plastic characteristics make plastics litter particularly problematic. While plastics may break into smaller pieces, plastics does not effectively biodegrade on the environment – it lasts for decades or centuries, so every piece of plastic that has been littered (and has not been picked up or eaten by wildlife) is still in the environment. Plastics also are light – they float in water and are easily blown in the wind from place to place – so, unlike other types of litter that sink, or stay put, plastics are highly mobile.

It is argued that degradation of materials is not a practical or functional technique for alleviating litter problems, and that consumer education and awareness are the primary practical solutions to effectively addressing litter concerns. This may be true, but plastics still have undesirable litter properties that need to be addressed.

Plastics are a major component of litter – almost 90 percent of floating marine debris is plastic, plastics are by far the largest category of litter in nationwide Coastal Cleanup programs, and plastics make up between 30 and 80 percent of roadside litter collected.²⁷ While marine debris creates the most costly problems, 60 to 80 percent of marine debris originates from land-based activities.²⁸

The effects of plastic on marine wildlife are well documented – particularly problems arising from ingestion or entanglement. Scientists also are identifying new areas of concern related to plastics litter, including the adsorption of toxic substances in seawater to plastic resin pellets, and the transportation of invasive species such as barnacles, mollusks, sea worms, and corals to islands and other sensitive ecosystems, traveling on plastic litter “boats”.²⁹ Once established, invasive species are almost impossible to remove, and often result in devastating environmental and economic impacts. Plastics litter also causes quantifiable economic damages to fishing and recreational boats.³⁰

Of immediate concern to California are the implications of plastics litter on storm water control systems. To meet Clean Water Act quality standards, the Los Angeles Regional Water Quality Control Board recently passed a zero-tolerance for litter entering its region’s waterways through the storm water system. This means that, after a thirteen-year phase-in period, no litter will be allowed to pass into, or through, their storm water systems.

Currently, plastics are a major contaminant in storm water runoff. Los Angeles County alone spends \$1 million a year on beach clean-ups after storm events, when beach litter is at its worst. Los Angeles County could be required to spend as much as \$400 million over twelve years to trap litter in its storm system before it reaches the waterways and beaches.³¹ Some cities in the Los Angeles region are actively pursuing stringent solutions for plastics litter storm water runoff, including banning the sale of some plastic products.

Litter is not the only unintended consequence of plastics. Plastics are made from oil or natural gas. While only a small portion, 3 to 4 percent, of oil production ends up as plastics, the production of plastics, including chemicals and additives incorporated into plastics, may have impacts. The potential health and environmental impacts of plastics are an area of controversy, but there are few definitive answers at this point. There are certain types of plastics or additives that appear to be problematic, and research is ongoing to determine or identify these problems.

Meanwhile, some environmental groups, such as Greenpeace, argue to reduce or eliminate plastics use, while others, such as the American Plastics Council, stress the positive benefits of plastics. It is often difficult to determine, through the polarized rhetoric on both sides, to what extent plastic health issues and problems actually occur, and if they do occur, how serious the risks really are

Plastics Litter is Predominant in California's Storm Drain Runoff



Source: 24.

Plastic risk areas that are under examination include the production, use, and disposal of PVC, brominated flame retardants, and additives such as phthalates. PVC is of additional concern because it is a contaminant in PET recycling.

The State of California, Office of Environmental Health Hazard Assessment (OEHHA), is conducting a risk analysis of PVC for the California Integrated Waste Management Board. There also are research efforts and campaigns at the national and international levels to examine many of these issues. In terms of immediate public policy implications for California, while the uncertain potential health and environmental impacts of some plastics should not be ignored, there is not enough solid information at this point to make policy decisions regarding plastics, beyond the promotion of research initiatives and sound, unbiased information sharing.

Plastics Resource Use is Not Being Effectively Managed

Inventions of the 20th Century, plastics are everywhere. While society has found ample ways to use plastics, we are less adept at managing the material when we are finished with it – often after only one use. The volume of plastics being produced, used, generated, and discarded is greater than ever before, and plastics require more effort and ingenuity than ever before to properly manage.

Just as there is no single type of plastic, there is no single approach to plastics waste management. There are at least five distinct plastic management tools today. New options are being developed every year to effectively manage plastics that may make some of these strategies obsolete.

First, some plastics can, and should be, reused. Second, some plastics should be recycled back into containers, or other products. Third, some plastic products should be made biodegradable and collected for composting (assumes the necessary collection for composting facilities). Fourth, some plastics that are uneconomic to recycle should be converted to fuel (assumes the necessary development of technologically and economically feasible conversion facilities). Finally, fifth, some plastics should continue to be disposed, as collection and sorting of these plastics is currently too difficult or costly.

Today, far too much plastics are disposed, with inadequate, or no use of the other four plastic management tools. As a result, we are not managing plastics as effectively as we could, and are thus losing opportunities to conserve resources. We can not keep disposing and discarding plastics into the environment at our rates of the last 30 years – plastics accumulation may cause more costly economic and environmental solutions later, if not properly managed now.

Resource conservation is a goal that underlies California's solid waste management agencies' missions and policies. Resource conservation is the careful utilization of a natural resource in order to prevent depletion. It is the act of conserving through preventing injury, decay, waste, or loss of resources.

A significant component of resource conservation is using less material – source reduction – in which plastics play a major role. Source reduction is at the top of the waste management hierarchy, and plastics need to be explicitly recognized for their source reduction benefits. With the widespread use of plastics in hundreds of applications, there is no question that we are able to do more with less plastics material.

However, is it not enough to simply switch to plastics wherever feasible, and throw less plastics trash away when we are done with it, simply because it is source reduced over other material types. When we do use a plastics material, and it can be technically and economically reused, recycled, composted, or converted, these should be the responsible steps in the new plastics waste management hierarchy.

In particular, one-time use plastic products and packaging are not being adequately addressed. Packaging plays a vital role in the delivery of consumer goods to the public, it is essential for safety, transportation, convenience, consumer acceptance, containment, protection, communication, and utility. However, the proliferation of plastics packaging and disposable products is growing more rapidly than our ability to effectively manage these materials. The result is more plastic materials being discarded – either properly or improperly – and more plastic materials are entering our landfills and environment. Again, plastics are not the only material causing these concerns, but they are the most rapidly growing material, and thus garner and warrant the most attention.

We are currently struggling to effectively manage plastics within the conventional waste management hierarchy, where non-plastic materials are much more homogeneous in nature and more receptive to this traditional framework. We must now broaden our management approach to plastic materials that are highly heterogeneous in type and application. Reuse, recycling, composting (of biodegradable plastics), and plastic conversion technologies, all where proven technologically and economically feasible, can keep plastics in our economy and the materials-use cycle, and out of California's landfills and environment.

There are ample opportunities to increase plastics recycling in California, and in many applications, recycling is an effective waste management tool for the growing plastics waste stream. There also are untapped opportunities to promote plastics reuse, and the use and composting of biodegradable plastics. Conversion technologies offer further opportunities to keep plastics out of landfills, while creating a valuable fuel product. There is no reason to dispose of plastic materials when they have inherent value – as a material or a fuel – especially when the environmental costs of disposal and discard are high.

Plastics Present a Timely Public Policy Challenge

Plastics of some form or another are here to stay in our lifetimes, as they are integral to our lifestyles and economy, and they have large societal benefits. However, on the other side of the scale, there are significant economic externalities in the plastics production, use, recycling, and disposal lifecycle phases (i.e., litter, marine ecosystem impacts, know/unknown chemical emissions, and other potential health risks). The benefits of plastics must be brought into balance with the full economic and environmental costs of plastic.

Many of the long-term plastic structural issues (general uneconomical recycling opportunities and relatively low recycling rates) have not changed materially in the last twenty years. Going forward, optimizing plastics use, recycling, and disposal in California will require a significant shift in public policies.

The use and disposal of plastics bring with it a number of public policy challenges. While the conventional resource policy of “reduce, reuse, and recycle” have made an impact on the environmentally sound disposal of plastics, in the final analysis, most single use throwaway consumer and commercial plastic products end their life in a landfill.

We are now at a plastics crossroads, a renaissance of sorts, of new and exciting potential change with regards to plastic policies and technologies. Government/industry collaborative partnerships, and smart public policies can help optimize our plastics use, recycling, and disposal in California.

Optimizing Plastics Use, Recycling, and Disposal Presents a Timely California Public Policy Challenge





Why are California Plastic Policies Not Working? ■



Why are California Plastic Policies Not Working?

17

There are four major existing California environmental laws that relate to plastics. Three of the laws, AB 939, SB 235, and SB 951, are under jurisdiction of the CIWMB. The fourth law, AB 2020, is under jurisdiction of the DOC. These four laws, both individually and combined, are flawed with regard to effectively managing California's plastics, and hence the State's plastic issues are not being adequately addressed.

Plastics Have Not Been Effectively Incorporated into California's Integrated Waste Management Program (AB 939)

The Integrated Waste Management Act of 1989 (AB 939) established a new approach for managing California's waste stream, one that created a hierarchy of waste prevention first, followed then by recycling and composting. Central to AB 939 were mandated goals of 25 percent diversion for each city's/county's waste from landfills by 1995, and the highly ambitious goal of 50 percent waste diversion generated within each jurisdiction for 2000. The legislature amended this statute in 2000, requiring jurisdictions to sustain their waste diversion efforts into the future.

There are several successes and failures of AB 939 recycling and landfill legislation, as it relates to plastic. AB 939 compliance requires that all city/county California jurisdictions meet the 50 percent diversion goal.

AB 939: Recycling and Landfill Legislation

Successes

- City/county jurisdictions have achieved diversion rates by tailoring waste handling infrastructure options that include curbside recycling, material recovery facilities, and composting operations, that are supported by waste prevention and public education efforts
- The State's diversion and recycling infrastructure now represents an investment of hundreds of million of dollars of public and private sector funds. California's reuse and recycling industry employs over 60,000 workers, with a several billion dollar payroll

Failures

- The State has not met its overall 50 percent waste diversion goal, though several jurisdictions have met or exceed the 50 percent goal. In 2002, approximately 100 California jurisdictions exceeded the goal, but this number is less than twenty-five percent of the 444 reporting jurisdiction diversion programs
- There are a number of reasons why most California jurisdictions have not met their 50 percent diversion mandate including:
 - The State's economy soared in the 1990's, driving up estimated waste generation nearly 50 percent, from 45 million tons in 1989, to over 66 million tons in 2000
 - The relatively high costs for collecting and sorting recyclables of sufficient quantity and quality, and the challenges of maintaining markets for recyclables
 - The ambitious original 50 percent waste diversion goal

AB 939 is strictly a weight based system that does not favor plastics recycling in relative terms of helping to meet overall AB 939 goal attainment. Heavier materials, like paper, and construction & demolition, provide more potential diversion points (approximately 30 and 15 percent, by weight, respectively, of California's disposed waste); whereas plastics make up only 8.9 percent of total California disposed waste weight (versus over 15 percent by volume). Also, the built-in incentive of AB 939 to maximize weight quantity diverted, rather than quality collected, is generally counter to market demands for plastic recyclable materials.

Plastics recycling does contribute some towards AB 939 diversion. As a result of AB 939, and AB 2020, most local California jurisdictions have chosen to expand their curbside programs to include plastics recycling, even though it is expensive and jurisdictions have difficulty marketing some of their collected plastics material.

In order for communities' curbside programs to access curbside assistance payments (California Redemption Value) from the DOC, they must collect all plastic resin types. However, of the seven major types of plastics packaging (classified by the Society of Plastics Industry), only two resin types, # 1 and # 2 (PET and HDPE, respectively), are actually recycled at the curb to any significant degree in California. Most California cities and counties now have some kind of curbside collection program that includes # 1 (PET) and # 2 (HDPE) plastic bottles, and while most jurisdictions also collect plastic resins # 3 through # 7, these other resin quantities collected are minimal.

In California, the costs to curbside collect PET and HDPE plastics are offset by a combination of market scrap value, and AB 2020 processing and CRV payments. The effective plastic economics of California's curbside collection programs are highly dependent on payments from the AB 2020 program.

For PET plastics from curbside, local operators receive scrap value (currently approximately \$0.10 per pound), plus \$0.30 per pound in CRV payments and a processing payment of \$0.235 per pound (for the CRV proportion only). These total PET plastic revenues amount to approximately \$1,140 per ton (for beverage and non-beverage CRV), and currently offset costs to collect and process PET plastics at the curb. HDPE plastics also have a commingled rate for curbside collected material, thus curbside operators can collect both CRV and processing payments for HDPE as well.

The costs of collecting, sorting, and marketing non-beverage container plastic resins # 3 to # 7, generated in some California municipalities, is not economical, and it can be financially cumbersome. Some California municipalities may collect and sort these non-beverage container other resins, only to have them landfilled, much to everyone's disillusionment.

Plastics curbside recycling is confusing to the general public, and even to "professionals" in the field. There is wide variation among local governments in both the types of plastics collected, and the way it is collected.

Some municipalities, like Sacramento County, collect only narrow-necked, # 1 and # 2 plastics (includes soft drink bottles, water bottles, milk jugs, shampoo and conditioner bottles, and detergent and bleach bottles). Other municipalities, like the neighboring City of Sacramento, collect # 1 and # 2 plastic containers, and all California Redemption Value containers, including plastics # 3 through # 7. Both the City and County of Sacramento still do not accept, however, plastic bags, Styrofoam plastics, plastic food trays, and plastic cups. Both the County and City of Sacramento systems also use so-called "mixed recycling", which involves tossing all recyclables into a single large bin rather than requiring residents to separate plastics, aluminum, glass, and paper. Still other non-Sacramento communities currently require some separation of recyclables. In January 2002, only approximately 2 percent, by weight, of the mixed recycling in the City of Sacramento were plastics.

Some major communities around the country, such as the City of New York, have stopped collecting plastics at the curb all together for economic and other reasons. Critics of plastics recycling argue that it is expensive, does little to achieve overall recycling goals, and that processing used plastics often costs more than virgin plastics. Some environmentalists have even argued that increasing the capture rates of glass, paper, or yard debris can more cost-effectively, on the margin, divert resources from landfills, than collecting more plastics at curbside.

While relatively extensive commercial collection systems currently exist for film plastics, film also includes a large residential component. Film plastics are the single largest plastics component in California's landfills, and residential film is not generally being curbside collected at all, as it is too bulky and expensive to collect. Residential film plastics is highly problematic for California's curbside recycling, and the best that currently could be hoped for with residential film is to try to sort for it at a back-end materials recovery facility.

Plastics create several dilemmas and unanswered questions for California's AB 939 waste management program. There is confusion and inconsistency regarding the best practices for plastics curbside recycling in California, and there is controversy even on what the recycling goals of plastics should be for the various types of plastics. There is bewilderment at the consumer level on plastics recycling, and a general lack of agreement between government, industry, and environmentalists on what to do with plastics recycling under the AB 939 program. Without the major economic support of AB 2020, plastics curbside recycling in California would be struggling much further.

California's AB 939 waste management system currently may be able to only effectively collect # 1 and # 2 beverage container plastics. This "one size fits all" (i.e., all material types of aluminum, glass, plastics, paper, etc.), weight based system of AB 939, does not really effectively accommodate plastics. Curbside plastics recycling in California has a tough challenge under AB 939.

The Continuing Debate Over All Bottle Plastics Curbside Recycling in California

According to the American Plastics Council (APC), a trade organization for large plastic manufacturers, 95 percent of narrow-necked plastic bottles are made from # 1 or # 2 plastics. The APC argues that by asking communities to concentrate on just bottles, consumers will be recycling more of the most valuable plastics.

The APC wants more communities to go to the "all bottle" method because it is simpler, and they argue that more # 1 and # 2 plastic bottles are collected through this system. The APC argues that the simplified message "recycle all your plastic bottles" significantly increases collection of post-consumer plastic bottles. This APC program has had the support of several other industry trade associations such as the Association of Post-Consumer Plastic Recyclers (APR), the National Association for PET Container Resources (NAPCOR), and the National Soft Drink Association (NSDA).

In spite of the above APC policy, recycling coordinators in some California jurisdictions have been reluctant to adopt programs to collect all plastic bottles. Local government recyclers have cited concerns with potential for increased contamination (especially PVC plastics and residue disposal), increased costs of curbside collection and sorting (including mixed color HDPE), and overall reduced plastics material marketability.

Critics of the all bottle collection program argue that the APC initiative is not appropriate to show whether plastic curbside programs increase recovery of # 1 and #2 plastics, as asserted, any more than would other reinvigorated consumer education efforts. Another criticism of the all bottle program is that it creates the perception that # 3 to # 7 plastic bottles are finally being recycled, when in fact, these plastic bottles, in some cases, are not recycled.

The Rigid Plastic Packaging Container Law (SB 235) in California is Ineffective

The Rigid Plastic Packaging Container (RPPC) Act, SB 235, was originally passed in 1991. The intent of this plastics specific law was to “spur markets for plastic materials collected for recycling by requiring manufacturers to utilize increasing amounts of post-consumer recycled material in their rigid plastic packaging containers and to achieve high recycling rates for these plastic packaging containers.”

After State regulations were finally developed, 1995 was the first year that this plastics law was actually implemented, four years after bill passage. In 1995, the overall RPPC recycling rate was above 25 percent, so all companies were in compliance with the law.

In 1996, food and cosmetic containers were exempted from the law. Also, in 1996, the RPPC recycling rate, for the first time, fell below 25 percent (23.2 percent).

The 1996 trigger event required companies to retroactively meet one of four compliance options for their RPPCs. These options are to (1) use 25 percent recycled content, (2) source reduce by 10 percent, (3) meet a brand-specific recycling rate of 45 percent, or (4) be reusable or refillable at least 5 times.

The CIWMB sent surveys to randomly selected firms, starting in 1998, to determine compliance with the law. It was found that a large share of the survey respondents were not regulated, not in compliance, or were unsure of their status. For 1996 through 1999, the CIWMB found about ten percent compliance with the RPPC Act.

Over the last three years, the CIWMB has signed compliance agreements for those companies not meeting the law’s requirements with only 122 companies, and it is negotiating agreements with about 70 more companies in 2002. Compliance agreements for the RPPC law follow a basic template. An impacted company has six months to gear up to comply, and six months to prove compliance. Companies must submit interim reports on compliance and there are some special provisions for smaller companies. An impacted company that does not develop a compliance agreement could have to go to a public hearing, and a fine may be imposed. There are currently as few as four companies that may go to public hearings.

There are some successes and failures of SB 235 plastics packaging container legislation. The California recycling rate for RPPCs fell below 1995 levels in 2000, though total tons of RPPCs recycled has increased.

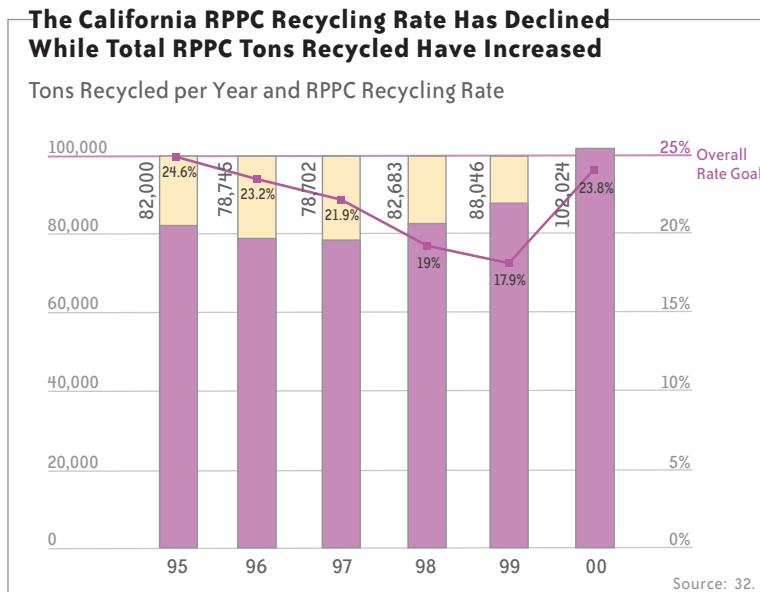
SB 235: Rigid Plastic Packaging Container Legislation

Successes

- Some companies that might not otherwise have considered using PCR, or source reducing RPPCs, have considered RPPC requirements as they design future products or specify packaging
- Six of seven surveyed companies that were out-of-compliance with the RPPC law in 1996 made changes to their rigid plastic packaging under compliance agreements, and are now in compliance with the law
- Obtained relatively higher compliance among some larger manufacturers
- Most of the companies in compliance during the first round of certifications were using PCR in their materials, at an average rate of 28.2 percent for the 253 containers using PCR
- Approximately 40 containers were source reduced an average of 14.5 percent

Failures

- Plastics are not meeting the 25 percent recycling rate goal for RPPCs, or the 55 percent recycling rate goal for PET. Both RPPC and PET rates fell below 1995 levels in 2000
- The law has relatively little impact on plastics recycling and markets, especially instate. Only 20 percent of the companies surveyed for 1997-99 were located in California
- There could be thousands of firms that are not aware that they are required to comply with the law
- The law creates perverse incentives to switch packaging from a regulated RPPC to another material, change containers, or reduce or increase container size to avoid regulation
- At least half of all RPPCs are exempt food and cosmetic containers
- In 1999, RPPCs comprised a total of 1.1 percent of the waste disposed, and 12.1 percent of the plastics waste disposed



SB 235 provides an ineffective and fragmented approach to dealing with only a small portion of California's plastic waste stream. Small firms, or those selling only a few RPPCs, have a difficult time meeting requirements of this law. Larger companies tend to be in compliance with the law, but they generally claim that it stifles packaging innovation, especially source reduction. Plastics source reduction under the law is difficult to measure and establish a baseline, and it is hard to verify source reduction within a RPPC.

The cost to the CIWMB for implementing and administering the RPPC law is high. There are approximately 10.5 CIWMB staff involved in this program, plus legal office, executive office, and Board member/staff time. If one assumes \$70,000 in costs for each staff, there is a State cost of \$735,000 per year for just direct staff costs alone.

There are high costs to industry to effectively comply with the RPPC law and document compliance. For an average size company, from the time they receive notification from the CIWMB that they are subject to compliance, until a decision is made, costs could likely exceed \$100,000 at minimum, not including costs of actually changing any company containers. If a new injection mold is needed for compliance, the cost to a company could be in the millions of dollars. Industry also spends a significant amount of money in lobbying related to this law. During the 2000 Legislative session, industry opponents to a possible expansion of the RPPC law spent

approximately \$4.5 million to lobby members of the California Legislature against expansion of the law.

Food and beverage containers are exempt from requirements of the RPPC law. However, interestingly enough, these same exempt containers are used to calculate the RPPC and PET statewide recycling rates under the law.

The RPPC plastics law overlaps with some plastics in the California beverage container program. For example 67 percent of the RPPCs recycled in year 2000 were CRV plastic program containers. The total tons of plastic containers recycled and reported through the California beverage container program account for over 95 percent of the RPPC and PET plastics used in the RPPC and PET recycling rate calculations for the SB 235 law.

The State of California is spending significant government and industry, time and money, for administrating and complying with the RPPC plastics law. On the benefit side, there has been little plastics environmental gain from this law, and the law has not made any significant impact on plastic recycling rates, or markets, in the State.

The Plastics Trash Bag Law (SB 951) in California is Obsolete

California's recycled content requirement law for trash bags by manufacturers of plastic trash bags, SB 951, was enacted nine years ago, in 1993. The intent of this plastics specific trash bag law was to encourage the diversion of polyethylene from California's landfills by establishing a market for it in plastic trash bags. SB 951 required all trash bags 0.75 mil, and greater, in thickness to use 10 percent recycled-plastic, post-consumer material (RPPCM), later increasing to 30 percent.

SB 698 was then signed into law four years ago, in 1998, and amended certain provisions of SB 951. SB 698 eliminated the 30 percent recycled-content requirement for trash bags, and replaced it with two compliance options for bags 0.7 mil, and greater, in thickness. These two options are (1) ensuring that a manufacturer's plastic trash bags contain a quantity of RPPCM equal to at least 10 percent of the weight of the regulated bags or (2) ensuring that at least 30 percent of the weight of material used in all of a manufacturer's plastic products intended for sale in California is RPPCM.

Plastic trash bags are made from various types of plastics, including HDPE, LDPE, LLDPE, and PET. Regulated plastic trash bags are between 0.7 and 2.0 mils in thickness. The used material that serves as feedstock for trash bags includes dry cleaning bags, grocery store bags, mattress bags, furniture bags, irrigation tubes, and stretch wrap.

Plastic trash bags under the law include garbage bags, composting bags, lawn and leaf bags, can-liner bags, kitchen bags, compactor bags, and recycling bags. There are approximately 21 regulated plastic trash bag manufacturers under the plastics trash bag law, 8 of which are located in California.

There are some successes and many failures of SB 951 plastics trash bag legislation. The plastics trash bag law in California is currently obsolete given the present secondary market demand for plastics film by makers of composite lumber. A major advantage of this lumber market is that it does not have the strict quality requirements of closed-loop trash bag recycling, and can thus take more polyethylene from the wastestream.

The CIWMB was required, before October 1, 2001, to make recommendations to the Legislature regarding the content of recycled post-consumer plastic in trash bags. The Board approved the following two recommendations at its September 2001, meeting: (1) increase the amount of RPPCM by an amount still to be determined and (2) remove the exemption from compliance for manufacturers who could not meet the RPPCM requirements, as stated by law.

In a January 2002, workshop at the CIWMB, industry raised serious concerns about these recommendations. Trash bag manufacturers, especially large companies, were finding it impossible to meet the 10 percent standard because there was not adequate quantity and quality of post-consumer film.

At the Board's May 2002, meeting, CIWMB staff presented additional options for trash bags, namely, (a) increase recycled content to "x" percent, (b) eliminate the exemption, (c) provide additional compliance options such as source reduction, biodegradable trash bags, or tradable credits, (d) make no changes in the law as it now exists, (e) defer any recommendation until after completion of the plastics white paper, (f) direct the Board to work with the DGS to develop a list of approved brands for sale to the State, and (g) eliminate the certification program. Staff recommended that the Board approve Options (f) and (g), but the Board choose option (e).

There are numerous problems with the plastics trash bag law. The law has a minimal impact on polyethylene diversion, which has much greater effective markets in the domestic composite lumber and export markets.

One lesson learned from the plastics trash bag law is that it is difficult to micro-manage plastic markets via minimum content requirements over a period of time. Plastics are subject to strong market forces and international dynamics, and it is difficult to artificially force closed-loop plastics recycling when market forces may dictate open-loop plastics recycling. Residential film plastics continue to present a challenging plastics management problem for the State, but would do so equally, with or without, the plastics trash bag law.

SB 951: Plastics Trash Bag Legislation

Successes

- The use of recycled plastics in California by trash bag manufacturers in trash bags and other products has increased sevenfold over the last decade (from 2,000 tons to more than 14,000 tons), while creating business opportunities for a number of California manufacturers
- Almost one-half of all suppliers of recycled plastic for trash bags are located in California, and 78 percent of the 6,183 tons of recycled plastics used in California trash bags comes from California suppliers
- For small manufacturers of trash bags for sale in California, the amount of post-consumer material used has increased
- Using recycled post-consumer film in trash bags and other products has been shown to be an economically sound business decision for some manufacturers
- Technological trends in the manufacturing of trash bags may encourage more post-consumer content being included in trash bags (e.g., multi-ply bags that contain post-consumer film sandwiched between virgin film and development of new polymers resulting in the manufacture of stronger films with less material being used)

Failures

- The law applies to only about one-fourth of the trash bags manufactured for sale in California, and to none of the other film products
- Almost two-thirds of all bags produced according to California's minimum-content requirements are being sold by California manufacturers to users out-of-state
- The volume of bags imported into the U.S. has tripled in the past 5 years (almost 50 percent come from China)
- A sufficient quantity and quality of recycled resin does not exist to raise the amount of actual post-consumer content in bags above 10 percent, and large corporations make most trash bags for sale in California but generally exempt themselves from compliance for even the 10 percent requirement, due to unavailability, or poor quality, of post-consumer resins
- Proliferation of world markets for reprocessing film and manufacturing trash bags, as well as the creation of secondary markets and collection systems for plastics film by plastic lumber, siding, flooring, garden products, and traffic control industries, has resulted in a decreasing supply of post-consumer resins for use in domestic trash bags
- There is confusion over the legal definition of the kind of material to be used in trash bags (post-industrial versus post-consumer)
- There is a general shortage of post-consumer film for domestic trash bags due to the lack of collection programs and competitive demand for the small amount collected, particularly by manufacturers of plastics lumber and the like, and brokers who sell plastics film to foreign markets

Plastics Recycling Struggles under California's Updated Bottle Bill (AB 2020)

The California Beverage Container Recycling and Litter Reduction Act of 1986, AB 2020, is aimed at making beverage container recycling integral to California's economy. The primary goal of the program is to achieve, and maintain, high recycling rates for each beverage container type included in the program, thereby reducing the beverage component of litter in the State.

The AB 2020 law is a redemption program for beverage containers. The program is funded through redemption payments made to the DOC by beverage distributors on each beverage container sold in the State. Consumers pay the redemption when they purchase beverages.

Redemption payment revenues are deposited in the California Beverage Container Recycling Fund. Payments are made out of the Fund to consumers in the form of California Redemption Value (CRV) when consumers return empty beverage containers to certified recycling centers. The redemption payments are 2.5 cents for each container under 24 fluid ounces, and 5.0 cents for containers of 24 fluid ounces, or greater.

In January 2000, significant changes occurred within the AB 2020 program concerning plastics due to SB 332, which added non-carbonated fruit drinks, coffee and tea drinks, non-carbonated water, and sport drinks. In addition to adding many more plastic containers to California's bottle bill program, SB 332 now for the first time applied CRV to beverages sold in all of the seven (i.e. # 1 through # 7) plastic resin types. SB 332 also prescribed a \$10 million public relations and advertising campaign to help implement new containers in the program.

In January 2002, SB 1906 added further plastic containers to the program. This law added non-carbonated soft drinks and vegetable juices in beverage containers of 16 ounces, or less, to the State's program.

Beverage containers now covered by the AB 2020 program include those filled with carbonated mineral and soda water and other similar carbonated soft drinks; non-carbonated soft drinks, wine coolers and distilled spirit coolers, beer and malt beverages; non-carbonated water, mineral water, sport drinks, coffee and tea drinks, vegetable juice in beverage containers 16 ounces or less; carbonated and non-carbonated fruit drinks that contain any percentage of fruit juice; and 100 percent fruit juices that are packaged in beverage containers less than 46 ounces in volume. The law does not include any beverage container products not specifically included by the Act, such as dairy products, wine, and liquor.

Changes made by SB 332, along with natural growth, increased the total program beverage container sales from 1999 to 2000, by 26 percent. In

2002, changes attributable to SB 1906, again coupled with natural sales growth, resulted in a 6 percent increase in program container sales. These are huge increases in the number of program containers and CRV assessments. Over 75 percent of this increase is attributed to plastic containers, primarily PET plastics.

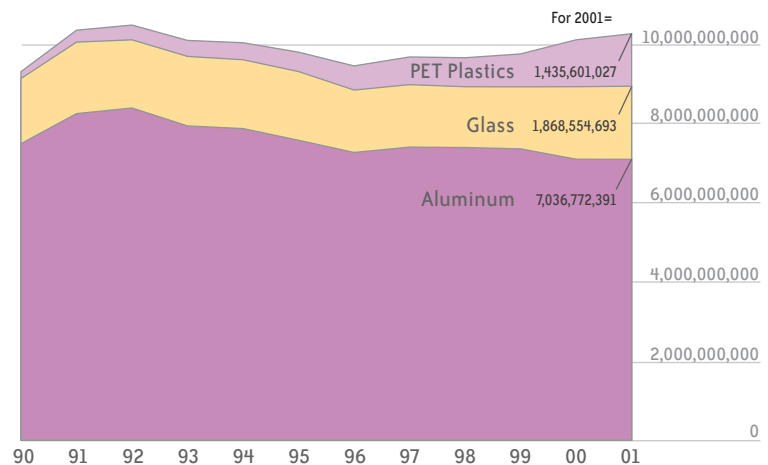
With the two recent changes in the AB 2020 law (SB 332 and SB 1906), sales of CRV beverage containers continue to grow. In 2001, with close to 7 billion unredeemed program containers, this equals nearly \$175 million in potential unpaid-out consumer funds.

In 2001, of the 17.5 billion containers sold in the program, approximately 4.6 billion, or 26 percent, were all types of plastics (of which 88 percent were PET plastics). This is both a significant number, and percent, of containers in the program, and plastics historically have generally not achieved their individual recycling goals.

There are successes and failures of AB 2020 bottle bill legislation as it relates to plastics. Even though the California PET beverage container recycling rate was 65 percent in 1999 (and 36 percent in 2001), with the highest PET beverage container recycling rate at 71 percent in 1994, the number of California PET beverage containers recycled has risen. PET beverage containers achieved the 65 percent container specific recycling goal four times in 14 years.

The Proportion of California PET Plastic Beverage Containers Recycled of Total AB 2020 Containers Recycled Has Risen

Containers per Year



Source: 16.

AB 2020: Beverage Container Recycling Legislation

Successes

- The AB 2020 program is widely recognized as one of the most efficient, and cost-effective, of all the deposit state programs, with the California redemption value half the size of most deposit states
- Stakeholders that support the program, as well as critics, recognize that the program has a high level of public acceptance, has met many of its original goals, including helping with litter reduction, and has promoted a State recycling infrastructure and ethic
- Californians enjoy a convenient form of container recovery with nearly 2,000 recycling opportunities statewide. The program is also used as a funding source for various recycling and litter reduction programs throughout the State
- California's beverage container recycling program now includes over 17.5 billion containers, of which over 10.5 billion were returned for recycling in 2001. The CRV of 2.5 cents that consumers pay when they purchase beverages, now applies to more containers than ever before

Failures

- A goal of the program is to achieve an 80 percent recycling rate for all aluminum, glass, plastic, and bimetal containers sold in California. In 2001, the all materials recycling rate was 60 percent
- The highest the all materials recycling rate achieved was 82 percent (in 1992). For the fourteen year period, from 1988 through 2001, the all materials recycling rate was 80 percent or greater, for only four different years (1995, 1993, 1992, and 1991)
- The low recycling rate of 2001 is largely attributable to the addition of new beverages to the program in 2000 and 2001. However, in 1999, before the addition of new containers to the program, the all materials recycling rate was still only 74 percent, below the original all materials goal set over sixteen years ago
- Another goal of the program is to have each beverage container type achieve a recycling rate of 65 percent. In 2001, only one material type, aluminum, achieved this goal with a 75 percent recycling rate. In 2001, the recycling rates for glass, #1 PET, and #2 HDPE, were 54 percent, 36 percent, and 39 percent, respectively. In 1999, the glass and #1 PET recycling rates were 60 percent and 65 percent, respectively
- Glass achieved the 65 percent goal seven times during the fourteen year period, 1988 through 2001, whereas #1 PET achieved the goal four times during this same period
- Beyond, #2 HDPE, the recycling rates for the other plastic resin types (#3 (PVC), #4 (LDPE), #5 (PP), #6 (PS), and #7 (Other)) are tiny, at most a few percent, or less, each
- AB 2020, in spite of its successes, has failures. The program includes an array of complex command-and-control regulations, requirements, fees, and payments which lead to seemingly endless legislative "reforms"

PET beverage container recovery in California has grown tremendously over the past few years. In 2001 approximately 1.4 billion PET beverage containers were recycled in the State. In 1998, four years earlier, only approximately 0.7 billion PET beverage containers were recycled in California. The number of California PET beverage containers recycled has thus doubled in the last four years. On the other hand, the number of PET beverage containers sold in California during the same four year period went up over three times, from approximately 1.3 billion PET containers sold in 1998, to approximately 4.0 billion PET containers sold in 2001.

PET beverage containers recycled in the State can be viewed as both a success story and a continuing challenge for the AB 2020 program. PET containers recycling are a success because of the large absolute numbers of PET beverage containers that are recycled, largely due to the success of the AB 2020 recycling infrastructure. However, PET containers remain a large recycling rate challenge for the AB 2020 program because of the large and growing volume of PET containers sold in the State. The denominator (or containers sold), in the State's PET beverage container recycling rate continues to outgrow the numerator (or containers recycled). Part of the reason for the large growth in PET beverage containers sold in the State is due to the demand for single service PET containers, whose growth really took off after 1994.

The number of PET beverage containers recycled in the State is expected to continue to grow. However, it is difficult to expect that the PET beverage container recycling rate will catch up much without further refinements to the AB 2020 program and other changes to California's plastic policies.

The California bottle bill is unique among the states that have a beverage container return system because in the other deposit bottle states, the cans and bottles are returned to stores from which the containers were purchased. In California, redemption material is collected and redeemed by participant type, including certified recycling centers and reverse vending machines; curbside programs; and collection, drop-off, and community service programs. Most AB 2020 material types are redeemed at recycling centers, except for # 2 HDPE plastics, which have a larger percentage (65 percent), collected through curbside programs.

AB 2020 materials that are light and easy to handle, such as aluminum, and have both scrap value and CRV value, are primarily brought to redemption centers where consumers receive CRV and scrap value payments. AB 2020 material that is heavier, or less easy to handle, such as glass, # 1 PET plastics and # 2 HDPE plastics, will have a larger component collected by donation programs such as curbside programs, collection and drop-off programs, and community service programs. Still, 67 percent of # 1 PET plastic program containers, and 25 percent of # 2 HDPE plastic program containers, are collected at redemption centers.

The CRV for plastic program containers # 3 through # 7 are currently returned exclusively through redemption centers. This is possibly because curbside and donation programs have decided not to separate these types of plastic for redemption, so that redemption centers are the only possible avenue to redeem and separate the non- # 1 and non- # 2 plastic program container types. There is no curbside commingled rate for # 3 through # 7 plastic beverage containers so curbside operators can only claim these plastic beverage container types if they are sorted.

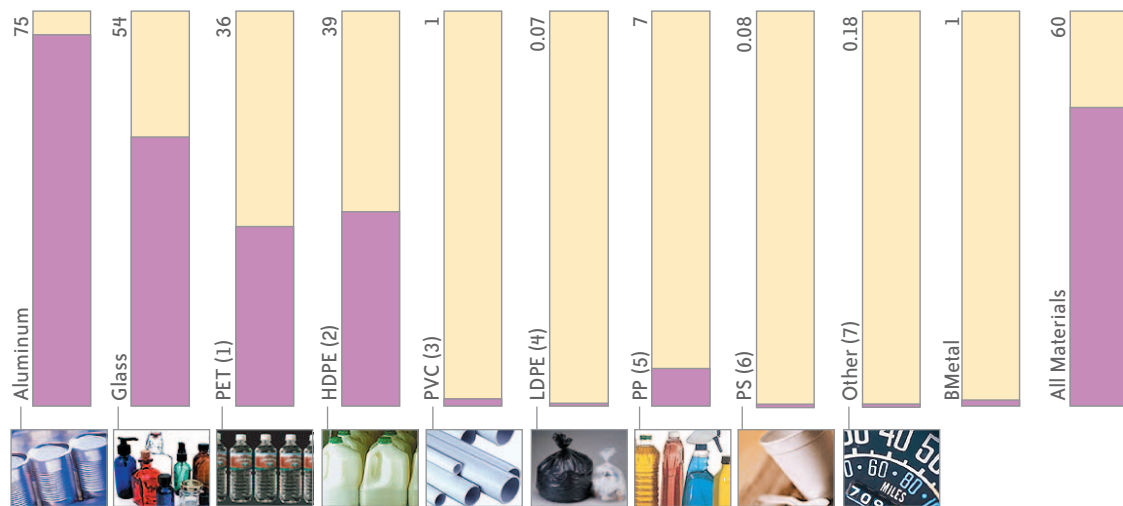
Traditionally, aluminum has always had, and still has the largest market share, per sales volume, compared to other material types, and the all material beverage container recycling rate generally follows the same trend as aluminum. There is very little market share for material types in the AB 2020 program other than aluminum, glass, and # 1 PET plastics. The glass market share in the program has remained fairly static in recent years. However, in the past two years, since inclusion of the new beverages and new plastic container types into the program, there has been a drop in the aluminum market share, and a gain in that for # 1 PET plastics. The result of this program shift is that the high recycling rate of aluminum now has a reduced impact on the overall AB 2020 program recycling rate, and the lower recycling rate of # 1 PET plastics now has a greater impact. Largely due to PET plastics, it will be even harder to achieve the all materials recycling rate AB 2020 program goal in the future.

In January 2000, when new beverages were added to the program they brought with them new containers also, namely # 2 HDPE, # 3 LDPE, # 5 PP, # 6 PS, and # 7 other plastics. The # 2 HDPE plastics already had an established market and they were being collected by most curbside programs for which they received a scrap payments only. Adding HDPE to the program did not require extensive adjustments for it to be collected, and the material had a program recycling rate of 22 percent in 2000, increasing to 38 percent in 2001. The California recycling rates for non-PET, and non-HDPE, plastic beverage containers was tiny in 2001.

Adding plastics # 3 through # 7 to the AB 2020 program has created significant unresolved issues for the program. These plastics were not typically collected previously and therefore have limited established markets. These non # 1, and non # 2, plastic resin types are sold in limited volumes and each have less than 1 percent market share of program beverage containers. Even if 100 percent of the # 3 through # 7 plastic beverage containers sold were redeemed in 2001, it would only raise the all material recycling rate by 1 percent.

California Recycling Rates for Non-PET and Non-HDPE Plastic Beverage Containers was Tiny in 2001

Recycling Rates in 2001



Source: 16.

SB 332 and SB 1906 added plastic containers with limited markets to the AB 2020 program, though these containers are a very small percentage of the total beverage container program. These two pieces of legislation, however, added a tremendous number of PET plastic containers to the AB 2020 program.

The container addition to the AB 2020 program has created concerns by some curbside programs regarding redemption by separate plastic resins. The DOC is reviewing the segregated and commingled rate structures to better accommodate the new plastic resin types. Currently there is a commingled (CRV + Non-CRV) payment rate for PET plastics and for HDPE plastics. There is no commingled rate for # 3 through # 7 plastics. There is only a CRV rate for these plastics, and this creates a particular problem for the curbside recyclers who must sort these containers in order to redeem them. The DOC is reviewing a commingled rate for # 2 through # 7 plastics so that curbside operators would be encouraged to redeem this plastic material. This DOC action would help recyclers, but some end users of HDPE are concerned that it will also adversely impact the quality of redeemed plastic material.

AB 2020 is a complex program that concerns itself with only approximately three percent of California's waste stream. Even after the addition of new beverages, there is consumer confusion about what is, and what is not, in the AB 2020 program. There is also confusion about how AB 2020 overlaps, or not, with the State's RPPC program.

For example, HDPE milk jugs are not in the AB 2020 program. Some plastic juice containers that are # 6 PS plastics, and have sealed foil lids that are not re-closeable (making it a beverage container), are new to the AB 2020 program. However, plastic clam shells (also # 6 plastics, but Expanded Polystyrene (EPS)), have a re-closeable lid, making them a RPPC. Finally, common "Styrofoam" coffee cups (EPS) are outside the boundaries of both the DOC bottle bill and the CIWMB RPPC program. All of this plastics container parceling is confusing to professionals working in the area, let alone consumers, and it defies both common sense and practicality.

While long-term structural plastic issues have not changed materially in the last 20 years, there has been significant plastic change in California with expansion of California's bottle bill program. Some of the changes to AB 2020 are still emerging, and time will tell if the beverage container program can accommodate the tremendous influx of PET plastic containers in terms of recycling rates.

Plastics create several dilemmas and unanswered questions for California's AB 2020 bottle bill. Can AB 2020 now meet its overall recycling goal with the now larger percentage of plastics? Should it still be mandatory for all redemption centers to take back all types of plastic beverage containers? Should we really be collecting plastics # 3 through # 7 plastics through this program at all?

Does there now need to be a different and higher CRV for plastics? Do we need material specific funds so that plastics would have their own earmarked, unredeemed CRV fund, versus the present common central DOC fund?

Is industry paying its fair share plastics processing fee if manufacturers are to internalize the cost of recycling their containers? Because there is very little plastics scrap value, the plastics processing fee is essentially the cost of recycling. Do we need a new, much higher processing fee for each plastics type # 3 through # 7, versus the one overall plastics processing fee such as we now have? Prior to the year 2002, beverage manufacturers paid the processing fee based on the number of containers recycled, not sold, and now the processing fee is supposed to be paid on the much larger number sold. Will industry actually pay much higher plastic processing fees for different plastic resin types?

Some of these policy issues may be resolved by current legislation and upcoming DOC actions. The DOC will be doing a cost-to-recycle study for each plastic resin type in early 2003. It is expected that the calculated costs to recycle these new program plastic resin types will be quite high.

The forthcoming new processing fee for each plastic resin, that is supposed to be implemented in January 2004, along with any new potential legislation that pushes the processing fee higher for containers with lower recycling rates, could have a major impact on California's viability of putting beverages in containers other than PET and HDPE plastics. Will industry really pay a potentially very high processing fee for plastic resin types # 3 through # 7 so as to guarantee that each container "pays its own way"?

Some argue that AB 2020 is in a transitive state, and with the new plastic processing fees forthcoming in 2004, that redemption centers will get fairly compensated once the AB 2020 program is fully operational. Many program participants argue not to make any further changes to AB 2020 until the real impacts of SB 332 can be ascertained. While all these upcoming actions should improve plastics recycling within the program, we question if the AB 2020 system will ultimately be able to effectively accommodate all kinds of plastics.

California's AB 2020 bottle bill may only be able to effectively take back # 1 and # 2 plastic program containers. Does the one size fit all approach (i.e., all material types) of AB 2020 now fit plastics, and all subcategories of plastic? California's AB 2020 bottle bill also has a tough challenge concerning plastic beverage containers.

Plastic Issues Have Not Been Adequately Addressed in California

Of the four major California laws that concern themselves with plastics none come close to effectively managing the State's plastic issues. Additional focused improvements to the State's existing laws, overtime, will likely be unable to address the unique and fundamental, long-term structural characteristics of plastic issues.

Two of the State laws, AB 939 and AB 2020, concern themselves with multi-material types beyond plastics, and two of the laws, SB 235 and SB 951, only focus on a narrow segment of plastics. Both sets of State laws have little future potential for managing the broad and complex range of plastic issues that the State presently faces.

The two diverse, multi-material (including plastics) State laws, AB 939 and AB 2020, struggle to adapt to the unique and heterogeneous attributes of plastics. These two laws, the largest and most significant of the four, have had much greater success with the other more homogeneous, non-plastic material types. For these two State laws, “one size does not fit all” for plastics overall, and for the different types and applications of plastics within the overall plastics material grouping. While AB 2020 has had success in PET plastics beverage container recycling, this is only one segment of overall plastics use.

The other two specialized plastic State laws, SB 235 and SB 951, are much too narrowly focused on only a sliver of plastic types and issues. These two laws also have proven themselves inflexible to adapt to rapidly changing plastic technologies and market conditions.

All four of the California laws are fractionalized, or piecemeal in their own way with regard to plastics, even considering the two multi-material laws. At best, all these laws only try to address a small portion of the overall plastics management challenge. Two of the laws, SB 235 and SB 951, essentially became ineffective and obsolete upon their final actual implementation.

No matter how piecemeal, ineffective, and short-term focused are the four plastic State laws, there is subtle reluctance on the part of all major plastic stakeholders (government, industry, and environmentalists) to overly scrutinize these laws, let alone give them up entirely, or even temporarily suspend them. Pragmatic stakeholder reasons favor the ineffective status quo State laws and institutions concerning plastics.

For government, each of these laws is now a known institution, with its own inertia and institutional infrastructure, and sometimes the “known” is more comfortable than the unknown is, and these programs have become vested by some management and staff. For industry, many companies have already adapted to these regulatory laws, and they are reluctant to overly criticize them as something much more onerous, from their standpoint, could come in its place. For environmentalists that have fought so hard over many years to get these plastic laws enacted, it is difficult to give up these “positions”, when there is not a known and better replacement alternative.

All of the major plastic stakeholder groups usually often see only a relatively small portion of the overall statewide plastic issues (for example one plastics law application or one plastics container or resin type). Up to now, very few of the stakeholders have examined the totality, and cumulative impacts, of combined plastic waste management issues.

There are major inadequacies in our present California plastics management and regulatory system. These inadequacies will be highly challenging to address and change. However, there is now a need to reassess the role and effectiveness of each of California’s four major plastic laws in terms of meeting our larger goal of optimizing plastics use, recycling, and disposal in California.

Our current plastics management and regulatory system is “not good enough” to meet the magnitude and significance of our State’s cumulative plastic issues. There is a need to start considering new, realistic, and better alternatives to the current plastics management and regulatory system in the State.



What Should the State Do About Plastics? ■



While progress has been made in recycling and conservation of the State's plastics, there are unaddressed problems related to plastics use, recycling, and disposal. Existing California policies are not successfully addressing the State's plastic issues.

Plastics are really a victim of their own achievements. Plastics are garnering attention because they have successfully displaced other materials in a broad range of products and packaging. However, plastics also have displaced other materials in the State's landfills and environment.

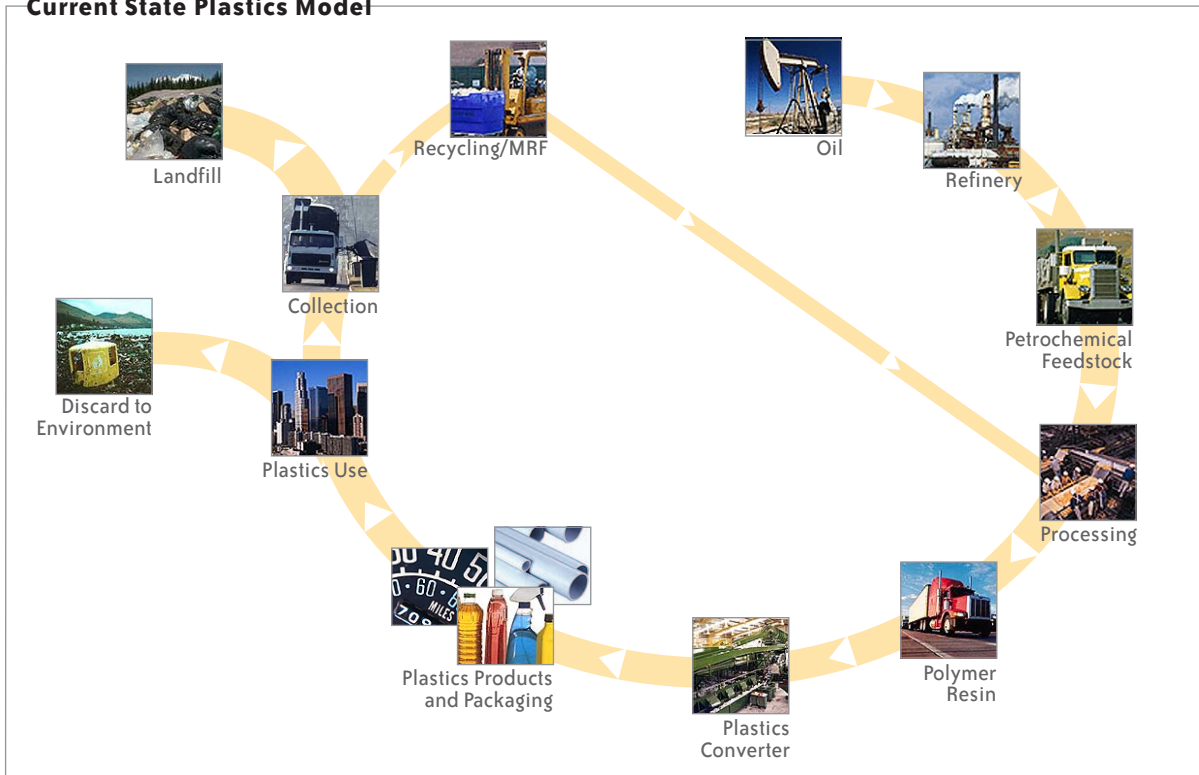
It is time to reevaluate what has already been implemented in the State to manage plastics, build on those policies that are working, and replace what is not with new and smart policy options. California, along with the United States, is already behind much of the rest of the world in trying to manage plastics and packaging waste. However, plastic policies applied in other parts of the world have their own specific flaws, and many of these policies are not appropriate for California. Today, California has the opportunity to take a leadership role in plastics management by providing a collaborative process for all interested stakeholders to work together so as to identify and implement new and unique California specific solutions to promote plastics resource conservation, increase plastics recycling, and increase the use of recycled plastics.

A Fresh Approach is Needed for Managing Plastics in the State

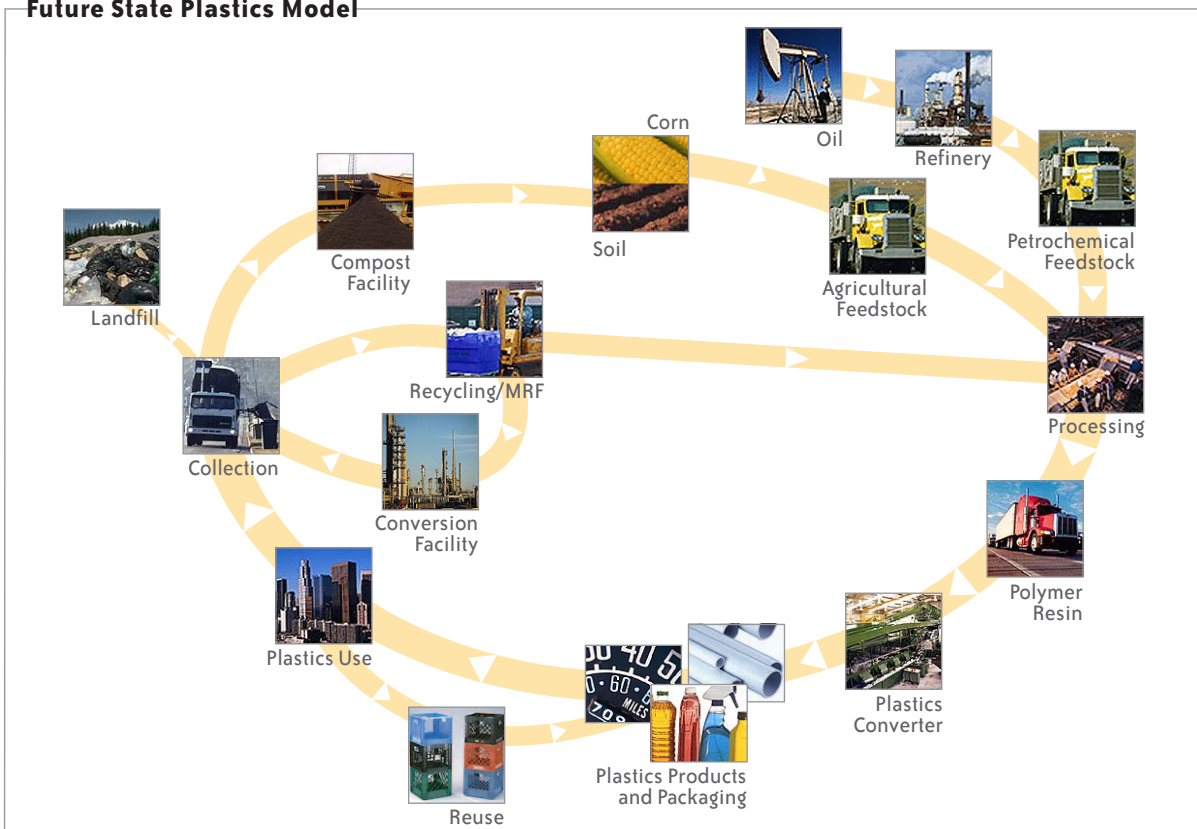
There is no single answer, policy, or program that will achieve all California plastic policy goals. Some plastics can, and should, be recycled, some plastics should not be recycled; some plastic products can, and should, contain recycled content, some plastics should not; some plastic products should be biodegradable, some should not; some plastics waste should be converted to fuel, some should not; some plastics are managed appropriately today, most are not.

Our current plastics management model has most plastics being landfilled, some recycled, and some escaping to our environment. A future plastics model would have an optimal mix of management alternatives for plastics, including reuse, recycling, composting, and conversion. In addition, there will be many other, currently unknown, technological alternatives developed in the future to supplement this plastics management mix. The challenge for California is to develop and implement a range of flexible policies and programs that will allow environmentally sound, technologically appropriate, and economically efficient solutions to rise to the top for each plastics type and application.

Current State Plastics Model



Future State Plastics Model



Certain State Plastic Policy Issues Need to Be Explicitly Considered Upfront

The first question, before asking what plastic policies to implement, is what should be California's plastic goals? Several broad plastic policy goals have been proposed.

Plastic goals should acknowledge that we need to embrace plastics for their positive benefits to our society and economy at large. At the same time, our goals need to stress that we have to better manage this material so as to address the environmental and economic externalities generated as plastic's use becomes more and more widespread.

Plastics recycling and increased collection goals should be promoted when technically and economically feasible, but not to the exclusion of other management goals. Plastics recycling alone will not solve the State's plastic management issues.

Solving problems arising from increased use and disposal of plastics will require all involved parties to work together to identify and implement a broad range of solutions. If plastic management issues are not addressed now, they will

only get worse later. It is time for stakeholders to work together to address solutions for managing the increased use of plastics in the State.

Folded into a list of plastic policy goals and objective should be the three specific objectives of this plastics white paper: (1) increasing the plastics recycling rate, (2) increasing the use of recycled plastics, and (3) promoting plastics resource conservation. These three objectives are all reasonable, but as is so often the case, the "devil is in the details". What plastics should be recycled? How much plastics should be recycled and at what cost? What "counts" as plastics recycling? Who should pay for plastics recycling? What products should use more recycled plastics? If products are manufactured out-of-state, what is the impact on California's plastic markets? How do we balance and measure plastic source reduction and recycling goals? What is resource conservation as it applies to plastics? Do we use mandates or incentives, to achieve plastic goals? What should the criteria for evaluating plastic policies be? Examining each of these plastic policy questions in more detail can help illuminate potential plastic policy directions for California.

Plastic Policy Goals and Objectives

Issues

1. Plastics are here to stay in our lifetimes as they are integral to our lifestyle and economy, and they have societal benefits due to their light weight and versatile range of applications
2. There are significant economic externalities in the plastics production, use, recycling, and disposal phases (i.e., litter, marine ecosystem impacts, chemical emissions, and known/unknown health risks)

Goals

1. Do not eliminate plastics. Instead, develop management systems to optimize plastics use, recycling, and disposal, benefiting from the positives of plastics and minimizing their negatives
2. Develop policy options that internalize the economic and environmental externalities associated with plastics and equitably shares these costs between all involved parties
 - a. Develop funding mechanisms to support internalization of plastic externalities. This funding could be used for:
 - Preventing and cleaning up marine and land-based plastics litter
 - Plastics resource conservation education
 - Efficient plastics collection and recycling
 - Acceptable plastics disposal
 - b. Minimize the use on hazardous or potentially hazardous additives in plastics
 - c. Conduct research on the impacts of various plastics on health and the environment, and seek to reduce the harmful impacts of plastics.
 - d. Minimize improper discarding of plastics by providing adequate receptacles and locations for discarding or recycling plastics

Plastic Policy Goals and Objectives *(continued)*

Issues

3. Plastics production continues to far outpace plastics recycling, and it is displacing other more recyclable materials, as a result plastics in the MSW discard continues to grow rapidly, and it is the fastest growing portion of the MSW wastestream
4. Plastics represent a disproportionate share of landfill space, and next to paper, is now the second largest overall category of waste volume going into municipal landfills
5. The plastics recycling rate has stagnated at a low level, and plastics recycling quantities and rates remain lower than other materials such as steel, aluminum, glass, and paper
6. Plastics bottle-to-bottle recycling historically has been miniscule compared to other secondary material closed loop recycling
7. Plastics historically have been uneconomical to recycle without subsidies (average collection and processing costs exceed scrap values by more than two and one-half times), plastics are generally not as economic to recycle as other material types, and plastics recycling costs could rise further due to the proliferation of plastic containers. Higher plastics recycling rates come at an extremely high cost, and higher than that for other material types
8. Plastics are a global commodity, subject to the volatility of world economic forces
9. Plastics management issues have not changed materially in the last twenty years, and optimizing plastics use, recycling, and disposal in California will require a significant shift in public
10. Fundamental plastic issues are by their very nature, subtle, long-term, unmet social infrastructure challenges that have not been effectively addressed, partly because they are not as dramatic as some other shorter-term environmental concerns such as automobile tires, waste oil, batteries, or hazardous waste, nonetheless, plastics need to be addressed before they create a crisis

Goals

3. Promote plastics resource conservation and minimize the unnecessary use of plastics. Minimize plastics growth in the wastestream through source reduction, reuse, recycling, and conversion options that are environmentally sound and technically and economically feasible. Work to ensure that existing landfill systems can handle increasing levels of plastics
4. Identify reasonable recycling targets for plastics – some equal to other material types and some lesser. Promote technological innovations in plastics recycling where it makes economic and technical sense. Where recycling does not make economic and technical sense, promote plastics with reduced environmental impacts, such as biodegradable plastics. Also promote technological innovations for less-recyclable plastics such as conversion technologies
6. Encourage bottle-to-bottle recycling where it is technologically and economically feasible (for example: Coke, Pepsi, HDPE containers). Do not mandate closed-loop recycling when other open-loop options are also feasible. Develop policies that promote, or allow for either type of recycling
7. Promote and support innovations in plastics product and packaging design for recycling to allow for the economical collection of clean plastic streams. Develop and disseminate best practices in collection and processing systems to further support the economical collection of clean plastic streams. Develop and promote plastics collection and processing quality standards. Equitably spread the cost of recycling plastics among all responsible parties. Do not subsidize plastics recycling costs so as to create disincentives to collection and processing efficiencies
8. Allow flexibility in plastic policies and programs in order to accommodate changes in global economic conditions as well as new developments in plastics recycling and production. Consider the impact of potential new forthcoming California plastic policies within the context of a global plastics economy
9. Develop a long-term comprehensive approach to resolving plastics issues in California reflecting product stewardship/ shared responsibility principles and the unique characteristics of plastics as compared to other materials. Use a collaborative process with state and local government, industry, consumers, and environmentalists
10. Work with all interested parties to better understand and accept the long-term benefits and problems associated with plastics and agree to develop long-term policy options that take these characteristics into account. Promote and support clear, honest, and relevant information about plastics use, recycling, disposal, and its positive and negative impacts. Prevent future potential problems related to plastics rather than waiting to resolve them after they occur

What plastics should be recycled?

Not all plastics should be recycled. For many plastics there is not enough material of sufficient quantity or quality to warrant establishment of collection programs, processing, and marketing. Currently, beverage containers, some other rigid containers, film from commercial and some agricultural sources, battery casings, EPS packaging peanuts, transport packaging, and some durable goods are being recycled to some extent in California. Most other plastics are not being recycled to any meaningful degree in California.

In the future there could be recycling in place for other plastic types, such as shredder waste from automobiles, and more extensive electronics recycling. There also are new technologies that can potentially recycle mixed plastics into useable products. Because plastic technologies and markets are in continuous flux, it is not wise to over-dictate plastics recycling. Incentives that promote plastics recycling, or the conditions under which plastics recycling can become profitable, are preferable to mandates to recycle certain plastic materials.

Why should some plastics be recycled? Some argue that the economics of plastics recycling cannot be rationalized until the State prioritizes its goals and determines if the primary goal of plastics recycling is to reduce landfill waste or encourage the reuse of packaging. Although plastics in landfills are increasing at a rapid rate, plastics recycling does not contribute significantly to meeting overall State waste diversion goals. Plastic recycled content laws have been only moderately successful, and have relatively little impact on plastic recycling rates in California.

There are reasons to recycle some plastics, which pertain to broader resource conservation goals, particularly efficient use of materials and energy. There are plastic products and packages for which recycling is an effective management alternative, saving energy and resources, and maintaining the resin in the economic system as compared to permanently landfilling the material. The goal of plastics recycling should be the broader management goal of optimizing use of the material.

How much plastics should be recycled and at what cost?

It is not useful to establish a single plastics recycling rate for California. With policy support and incentives, the market should determine how much plastic, and which type, is recycled. The recycling rate for plastics is likely to be lower than for other non-plastic material types in many cases – and this is not inherently bad, when one considers the general source reduction benefits of plastics, as well as the high economic costs of recycling plastic. In their 1997 report, Solid Waste Management at the Crossroads, Franklin and Associates posed a recycling rate of 7 percent for all plastics by 2000 and 10 percent by 2010. The 1999 rate, nationwide, was just below 6 percent.

The California beverage redemption program has goals of 65 percent for each material type, including all plastics. PET plastics have exceeded this goal in previous years, and could probably do so again over time, once recycling catches up to the new containers. The 65 percent goal is a stretch, but it is probably also ultimately achievable for HDPE beverage containers, and even for HDPE milk jugs, which are not part of the beverage program. The 65 percent goal is not realistic for # 3 through # 7 plastic containers, as there are simply not enough containers and collection programs in these resin categories.

Rigid plastic packaging has a 25 percent recycling rate goal, which could probably be met through beverage container recycling alone, if the 65 percent goal were met for PET and HDPE. Through industry-funded return programs, expanded polystyrene (EPS) packaging peanuts are currently recycled at a rate of about 50 percent and reused at a rate of about 30 percent nationally.

Economically, it makes sense to focus on increasing recycling rates for those plastic containers and materials with a recycling infrastructure in place, rather than expending effort on new collection systems for small-volume plastic containers. However, the types of plastic products available to recycle are always changing, and if new markets for recycling develop – such as the film markets for composite lumber – these markets and recycling of these materials should be encouraged and promoted. Part of any forthcoming collaborative plastics effort of industry and government would be to establish realistic recycling rate goals for different plastic types.

What counts as plastics recycling?

There are many new plastic management alternatives currently being developed that are not traditional recycling, but could potentially divert plastic materials from landfills. These alternative management options should “count” as recycling, and be promoted and encouraged after traditional recycling. Once those plastic materials that can be effectively recycled have been pulled from the wastestream, other alternatives besides landfilling should be promoted.

Composting of biodegradable plastics is one such alternative. Biodegradable plastics are becoming available, and are nearing broader commercial market breakthroughs. Two particularly promising areas are biodegradable food containers (replacing PS), and biodegradable film for bags, particularly yard waste bags. Both of these biodegradable plastic applications are appropriate for composting, assuming the existence of cost-effective composting facilities.

There are a whole host of issues related to more widespread use of biodegradable plastics. For example, how would you sort biodegradable plastics from recyclable plastics on a sort line? Also, as there is a noticeable absence of MSW composting facilities in California, biodegradable plastics would need to be collected through special programs. For now, it seems that discrete biodegradable plastic and composting applications – for example food service, where the biodegradable plastic containers could be collected for a food composting program, and bags for yard waste, where they could be composted with their contents in yard waste composting facilities, are worth encouraging.

Potential conversion technologies that reduce plastic resins to fuel products are another area that could keep non-recyclable plastics from the landfill. If plastics are taken from the end of the sort line, once more recyclable plastic materials are positively sorted out, then, this is a preferable alternative to landfill plastics disposal.

Who should pay for plastics recycling?

In some cases, the cost of recycling plastics exceeds the scrap price recyclers receive. The California beverage container program provides a safety net, the processing fee, to cover costs of beverage container recycling. In some cases, such as film recycling programs for composite lumber, recycling is economic since the end-user is willing to pay enough for the material to cover the recycler’s costs. For other plastic products and container types, recycling is a losing proposition, economically.

The benefits that accrue from recycling – resource conservation, energy savings, reduced emissions, jobs, etc. – accrue broadly to society, and no one entity is interested in bearing the costs, which can be significant to an individual recycler. Broader sharing of plastic recycling costs – not placing the full amount on local governments, or consumers, would be preferred. Like the plastics industry has been doing under AB 2020 for over twelve years, and in some individualized collection programs, the plastics industry may be willing to provide additional support for plastics recycling at the collection level.

What products should use more recycled plastics?

Rather than dictating recycled content levels in certain products, the State should provide incentives to encourage recycled content in a range of closed- and open-loop products. Technologies and markets are changing too rapidly for recycled-content mandates to keep up – the California trash bag law is a prime example. However, there should be some incentives to use recycled content to help promote and encourage existing and new plastic markets.

Considerations for Promoting Plastics Source Reduction

One of the factors discussed frequently when considering diversion policies is that industry does not need additional mandates to promote source reduction. It is argued that the market's economic incentives to source reduce are strong enough to promote source reduction. In most cases this appears to be true, although there are certainly examples where marketing or other interests result in more packaging or product than is necessary. What is missing in waste management policies is a way to effectively measure and promote source reduction and to appropriately reward or credit source reduction efforts.

A collaborative industry task force may want to consider developing and promoting source reduction through metrics such as waste intensity and resource productivity. Waste intensity is the ratio of the amount of waste generated per unit of production or service output, such as packaging to product ratios. Resource productivity is the ratio of production or service output per material input, for example, the amount of heat conservation provided per pound of insulation. Both of these measures could be used to help reward and promote source reduction, perhaps through industry reports on plastic source reduction efforts.

If products are manufactured out-of-state, what is the impact on California's plastic markets?

One of the ironies of California's plastic laws is that, while they may have relatively little impact on plastic markets and products in California, they do have an impact at the national level. This helps keep California at the forefront of recycling policy, however, if the goal is to increase the use of plastics recycled in California, the policy is not very effective. There are two possible approaches to address this issue. One is to expand this California dialogue on plastic policies to the national level, the second, is to identify and implement policies that will emphasize, to the maximum extent possible, California plastic markets. California policymakers should consider whether a combination of approaches is appropriate.

How do we balance and measure plastics source reduction and recycling goals?

Source reduction is at the top of the conventional waste management hierarchy. It is also the most difficult option to measure, and thus to recognize. As a result, this preferred option often is given lower priority or emphasis than recycling and composting, which are much easier to monitor and measure. Plastics, which are almost always source reduced over other material types, are the main loser in this dilemma. In some cases, efforts to quantify or encourage source reduction actually discourage it – for example, the California RPPC law creates disincentives to source reduce plastic containers when they are introduced. Plastics should be appropriately recognized for their source reduction benefits. Use of new monitoring measures, such as resource conservation or waste intensity measures, could help address this issue, as well as checklists or company action plans to validate source reduction efforts.

What is resource conservation as it applies to plastics?

Resource conservation cannot really be fairly examined in isolation of a single material type, such as plastics. There are large substitution, or displacement, effects that impact overall resource conservation. Recognizing that other materials displacement needs to be importantly considered, below are six general goals for resource conservation as they apply to plastics, and other materials, in products and packaging:

- Use less material, especially less raw materials
- Use less hazardous, toxic, or potentially toxic materials
- Reduce materials entering the environment (including landfills)
- Make products last longer
- Make packaging last longer
- Reuse more material
- Recycle, compost, and convert more material.

When considering whether a plastics product, package, or material is achieving resource conservation goals, all of these aspects of resource conservation should be considered and policies should promote the appropriate balance for that plastics material, product, or package.

Do we use mandates or incentives to meet plastic goals?

There are many potential public policy tools that fit between the two extremes of a laissez faire market approach and command and control product or material bans and take-back mandates. Strict mandates have several problems – they are difficult to implement, costly for both industry and government, and often are relatively ineffective in meeting their policy goals. However, with some exceptions, the plastics industry overall is generally not adequately addressing plastics problems on their own.

There are costs associated with plastics production, use, and disposal that are not borne by those who produce the material, or those who use the material. Plastic policies must address these plastic economic externalities if they are to effectively solve plastic problems. Voluntary programs and incentives are generally preferable to mandates, and likely to be more effective in the long-run in meeting policy goals. However, if plastic industry stakeholders are not willing to contribute to, and work together towards developing long-term plastic solutions, some mandates could ultimately be necessary to achieve some plastic policy goals.

What should the criteria for evaluating plastic policies be?

Once the goals for plastic policies are agreed upon, the next step is to identify criteria to evaluate the proposed policies. No single policy can maximize these criteria simultaneously, policymakers must make trade-offs between criteria, maximizing all of them to the extent possible. For example, a plastics policy that is more complicated and difficult to administer could provide better flexibility and broader applicability. To the maximum extent possible, plastic policies and programs should strive for:

- Shared responsibility, between industry, consumers, and government, leading to a more equitable distribution of responsibility for the full environmental and economic consequences of a plastics product or package
- Broad applicability, as opposed to plastic resin, or plastic product specific policies. This must be balanced by the need to accommodate unique specific resin characteristics, while avoiding overly specific or prescriptive plastic policies
- Creating incentives for the “right” plastic actions (i.e. meeting plastic policy goals) while minimizing unintended consequences
- Flexibility, allowing for plastic technologies and markets to rapidly change
- Compatibility with current and future waste management systems

Should Certain Plastic Products or Packaging Be Banned?

Bans on the sale of plastic products are sometimes proposed as a means to solve plastic issues. Two potential plastic bans are most often mentioned – banning PVC containers, which are a contaminant in PET recycling, and banning polystyrene food service containers, which are not recycled, and are a major component of litter in storm drains. While bans may help solve immediate problems, they are generally not an effective long-term solution. Banning PVC containers would help reduce the cost of PET recycling and contamination from PVC. However, it is very likely that in the near future, some other new container type would be developed that would also create contamination problems. A more effective solution than banning PVC containers might be to pass on the extra costs of recycling PVC containers (or other containers with higher costs) in a processing fee (as should occur in 2004 under AB 2020). Similarly, banning PS food service containers would reduce the amount of PS entering storm drains, however the PS containers will be replaced by some other container type that may lead to other problems or negative impacts. Encouraging and promoting alternatives, such as biodegradable food service containers used in conjunction with food composting, and extensive litter reduction efforts, could be more effective than bans in solving problems posed by plastic materials. The problem with bans is that they are narrow in scope – addressing a very specific problem with a very specific solution. This narrow focused approach is an ineffective means to address a material with such global applications and ramifications as plastics. Bans should only be used by policymakers as a last resort.

- Political and social acceptability
- Reducing administrative implementation and transaction costs
- Including measurable costs and benefits to judge policy effectiveness
- Good “science-based” decisions, where a valid scientific basis exists
- Minimizing environmental and health risks
- Fairness, simplicity, and enforceability.

New plastic policies must be flexible. Plastic policies should not lock in on a set solution for a particular type of plastic – as the technologies and markets at all steps along the plastics spectrum are continuously changing, and policies that freeze in on a particular option are almost guaranteed to eventually fail. Plastic policies should also take into consideration business’ concerns of competitiveness, increasing the costs of doing business, and political realities surrounding increased fees and taxes in a depressed economic climate. Plastic is a highly diverse material, and any attempt to address plastic policy issues must include a diverse array of alternatives.

There are lessons learned from our experiences with the four existing California laws affecting plastic, and we should use this knowledge as we evaluate new plastic policies:

- A piecemeal approach to plastics policy does not work
- Markets change, and mandates may become ineffective or unnecessary over time
- New uses for plastics – both virgin and recycled – are continuously being developed, and changing the landscape for plastic markets
- Because plastic products and markets are changing rapidly, plastic recycling will need extra time, and extra effort to try to catch up to sales
- It is difficult to single out plastic material types and single plastic resin types in policy, and this could lead to unintended consequences, substitution of plastic materials, and inequities
- Administering complex public policy environmental laws is difficult, expensive, and unwieldy
- Left to the legislative process, a public policy may be amended beyond recognition, and lose track of its original public policy intent.

Modifications to Existing State Plastic Laws Need to Be Made

Current legislation can be improved, as it relates to plastics and plastic recycling. Recommendations for the four existing laws addressing plastics waste, recycling, and markets are provided.

AB 939: Recycling and Landfill Legislation

- *Address current AB 939 incentives that maximize the quantity, but not the quality, of recycled materials.* AB 939 is a weight-based diversion program. Plastics, with their light weight, will never contribute to a significant portion of AB 939 diversion, especially at the household/curbside level. Unfortunately, the current law creates incentives to maximize collection weight at the curb, for example through single stream collection programs. While these programs can increase the volume and weight of material collected, they can reduce the quality of material collected, and thus the material value and market potential. Plastics, with its high sorting costs and contamination issues, are particularly sensitive to this problem. The CIWMB and DOC should develop and expand policies and programs to increase the quality of plastics collected at the curb using incentive payments, education for recyclers, promotion of best practices, and grants for sorting and cleaning equipment, etc..
- *Support changes in AB 939 definitions (AB 2770, Matthews) to allow some diversion credits for conversion.* AB 2770, currently active in the 2001-2002 legislative session, allows the CIWMB to establish programs for the research, demonstration, evaluation, and promotion of new and emerging technologies that convert solid waste materials into new sources of energy, alternative fuels, chemicals, and other products. The law would allow cities and counties to use diversion for up to 10 percent of their diversion credits as long as certain conditions were met, such as using only post-recycled materials that would otherwise go to the landfill. While directed primarily at biomass conversion, there are also conversion technologies in development that convert plastics to low-sulfur diesel fuel. New plastic recycling technologies and plastic conversion technologies should be formally explored and supported by the State as an alternative for plastics that cannot be currently recycled, and would otherwise end up in landfills. Another alternative that could be pursued for non-recyclable plastics is as a fuel source in cement kilns and other similar applications.

SB 235: Rigid Plastic Packaging Container Legislation

- *Promote programs to boost the RPPC recycling rate beyond 25 percent through collection options, education, grants for sorting and cleaning equipment, and recycling incentive payments.*
- *Make legislative and administrative changes to streamline implementation of the RPPC law.* Legislation proposed in February of this year, SB 1970, Romero, was intended to increase flexibility and improve the RPPC law to make it easier for industry to meet law requirements, and easier for the CIWMB to implement the law. However, the bill was essentially scrapped, and all provisions relating to the RPPC law removed largely because industry did not want to validate the law by approving the suggested changes, but rather try for a full repeal of the law.
- *Repeal the ineffective RPPC law once a more comprehensive approach to plastics resource conservation, recycling, and market development is in place.*
- *Apply CIWMB staff and/or funding that is currently used to administer the RPPC law to supporting new plastic initiatives.*

SB 951: Plastic Trash Bag Legislation

- CIWMB staff research and industry comments over the last year indicate that there is no longer a need for the recycled content trash bag law to meet the intent of encouraging the diversion of polyethylene from landfills by establishing a market in trash bags. Markets for film plastic have increased significantly over the last two years with advent of the composite lumber industry. It has become increasingly difficult for plastic bag manufacturers, especially larger manufacturers, to obtain sufficient quantity and quality of recycled resin to meet the recycled content requirements. In addition, the law only applies to a subset of trash bags, and has relatively little impact on markets for recycled plastic film in California. However, if the law is simply repealed now, there may be little incentive for industry participating in a broader, more holistic approach to plastics resource conservation and recycling that would be developed through a collaborative process. The trash bag law

should stay on the books for now and CIWMB staff should continue to work with the DGS to promote and expand State purchases of recycled content bags. The trash bag law should ultimately be repealed when a broader plastics initiative is in place.

- *Repeal the trash bag law as it is now written, eliminating the certification program, once a more comprehensive approach to plastic recycling and market development is in place.* Direct the CIWMB to work with the DGS to develop a list of approved trash bag brands for sale to the State. In addition to trash bags with recycled content, examine the source reduction aspects of trash bags, or bags made of biodegradable materials in order to develop a list of “environmentally friendly” trash bags for State procurement.
- *Apply CIWMB staff and/or funding that is currently used to administer the trash bag law to supporting new plastic initiatives.*

AB 2020: Beverage Container Recycling Legislation

- *Make minor improvements in the program, as already proposed in current legislation and administrative changes, such as:*
 - Implement a single commingled rate for # 2 colored and # 3 to # 7 plastics.
 - Implement plastic incentive payments for recyclers (SB 1733, Sher). SB 1733 includes a provision, to the extent funds are available, to establish a plastic beverage container recycling incentive payment to be paid to certified recycling centers. The bill also increases processing payments made to certified recycling centers. These payments are intended to increase recycling rates for plastics, and could be used to support and promote plastics recycling. Implementation of this program should be done in a way that is equitable and promotes higher quality plastics recycling.

- Modify the processing fee for plastics (SB 1733, Sher). SB 1733 also includes provisions to change the processing fee paid by beverage manufacturers such that container types with a lower recycling rate pay a higher processing fee. This would create further incentives for plastic container manufacturers to switch from less recycled plastic resins (# 3 through # 7) to more recycled plastic resins (# 1 and # 2), or to work to increase recycling rates for those less recycled containers. This bill establishes a graduated processing fee payment. At the low end, container types with a recycling rate of 60 percent or greater would only pay a processing fee of 15 percent of the processing payment to recyclers. At the high end, container types with a recycling rate of less than 20 percent would pay a processing fee of 50 percent of the processing payment to recyclers.
 - Recalculate the processing fee in year 2003 based on the cost to recycle each plastics resin type. During 2003 the DOC will recalculate the cost of recycling in order to establish new processing fees and payments for implementation on January 1, 2004. For the first time since new containers were added to the program, the DOC will establish a separate processing fee for each plastics resin type (currently, all plastic processing fees are calculated using a plastics recycling cost of \$642.69). It is expected that the cost of recycling for beverage containers of plastic resin types # 3 through # 7 will be much higher than the current costs for PET plastics, and thus processing fees and processing payments should increase for those plastic containers. New processing fees can have two impacts, both of which should help increase overall plastic beverage container recycling. First, it can create further incentives for manufacturers using # 3 to # 7 resins to switch to PET and HDPE plastics, and second, it can provide additional, necessary support to recyclers to sort and recycle these smaller-volume plastic resin types.
 - Increase market development support for plastics through grants (SB 1857, Sher). SB 1857 would allocate \$10 million annually, until January 2006, for the DOC to issue grants for market development and expansion-related activities for recycling beverage containers. The legislation, part of a joint DOC/CIWMB effort, is intended to provide funding for research and development in the sorting, collecting, processing, shredding, or cleaning of beverage containers; identify and expand new markets for recycled beverage containers; and develop new products using recycled beverage containers. Plastics should be earmarked as a primary beneficiary of funding if this bill passes. Criteria for allocating the funds should take into account existing recycling efforts, and ensure that funds are equitably distributed and that distributions do not disadvantage established programs and businesses.
- *Initiate or reinstate programs as follows:*
 - Conduct a litter study, emphasizing the contribution of beverage containers to litter entering the storm drain system.
 - Expand the development of current new initiatives to help fund collection of plastic beverage containers at sporting events, parks, gas stations etc.
 - Use unredeemed plastics CRV to promote plastic beverage container recycling and litter reduction and enact legislation to allocate funds to support those efforts.
 - *Give the beverage container program time to adjust to the new plastic containers and changing markets* before making any additional changes to the beverage container recycling program, formally reevaluating the status of plastic beverage container recycling in 2005.

The Four Key Components to California's Long-Term Plastics Solution



There are Four Key Components to a Long-Term Plastics Solution for the State

A long-term approach to promoting plastics resource conservation, increasing plastics recycling, and increasing the use of recycled plastics has four key components. Three legs of the solution are policies for: (1) plastics collection and market development, (2) plastics public information, relations, and education, and (3) plastics research/development and new technologies. These three policy legs are supported by a fourth overall new long-term plastics shared responsibility policy framework that includes funding initiatives to finance programs in the first three areas.

Plastics Collection and Market Development

Expanding collection is the first step to increasing plastics recycling. The key to collection is not just obtaining as much material as possible, but obtaining material of a sufficient quality and quantity. The costs of collecting and sorting plastics are high, especially relative to the value of the material. In addition, current market forces such as increases in the number of single-serve containers, new resin colors, and resin barriers can potentially increase plastic recycling costs further. Policies to promote plastic collection and markets should increase quality and quantity, and reduce costs. Policies should also be equitable, for example not simply subsidizing new operations at the expense of existing businesses. Plastic collection improvements will also stimulate plastic markets, since better quality material is more likely to attract the attention of buyers, and obtain a higher price. The following five policies are intended to improve plastics collection:

- *Provide additional funding and research support for collection and processing technology development.* Emphasize efforts that will improve the quality of incoming materials and increase throughput (for example automation of processing lines). This policy could support research, pilot projects, and equipment purchases. An important aspect is that the policy should not jeopardize or put existing recyclers at a competitive disadvantage. One option, in addition to funding research at universities and other institutions, is to provide a payment to recyclers and processors, based on tons of plastic recycled, with the funds to be used for specified purposes. The recipient would be responsible for reporting recycling quantities and how the funds were used. The policy could use some SB 1857 funds initially, until long-term funding mechanisms are in place. This funding policy could be directed at plastic beverage containers, as well as other plastics collection such as film and polystyrene.
- *Develop and disseminate “best practices” in collection and processing systems to further support the economical collection of clean plastic streams.* The American Post-Consumer Plastics Recyclers (APR), and Institute of Scrap Recycling Industries (ISRI), have developed criteria and standards for collection and processing plastics. These criteria should be expanded or modified, as necessary, to reflect specific conditions in California, and then disseminated to local governments, waste haulers, and recyclers. In addition, the CIWMB and DOC should work with curbside programs to develop guidelines and information on improving the quality of plastic materials coming through the system.
- *Provide loans and grants for the purchase of collection and processing equipment such as automated lines, washing systems, etc.* (Use some SB 1857 funds initially until long-term funding mechanisms are in place). This policy would have to be implemented carefully to avoid putting companies that have already invested in such equipment at a competitive disadvantage.
- *Develop plastic material quality standards for recycled plastics (with an industry working group).* Again, building on existing standards from the APR and ISRI, refine and promote quality standards for recycled plastics and design for recycling. These standards should make it easier for recyclers to grade their materials, and reduce the number of loads that are turned down by manufacturers because they do not meet standards. Encourage manufacturers to “design for recycling” and minimize the environmental impact of packages, including eliminating hazardous or toxic constituents in packaging. Promote and expand on existing design for recycling initiatives and standards, such as those of the APR, ISRI, and U.S. EPA.
- *Significantly increase plastic beverage container nonresidential recycling with expanded collection at points where many beverages are consumed – parks, baseball fields, soccer fields, schools, gymnasiums, swimming pools, professional sporting venues, shopping malls, airports, etc.* Recycling of plastics, especially PET beverage containers are not keeping up with sales. Beverages are being consumed away from home at various locations, often with little, or no recycling opportunities. Most consumers will not bother to bring their plastic containers home in order to recycle them, they are just thrown away on-site. Every community in California has dozens (or more) nonresidence locations at which plastic containers are being thrown away every day, and especially every weekend. Establishing collection programs (including weekend collection) for recyclable plastic containers at these locations could potentially provide a boost to plastic beverage container recycling. These nonresidential plastic collection programs could be established within AB 2020 as part of the \$10.5 million expended annually for cities and counties, part of the \$500,000 in grants, and/or the proposed \$10 million annually in SB 1857. As a first step, the DOC could solicit proposals from recyclers, community groups, and local governments for pilot collection programs. After implementing pilot projects in a few communities, the most effective collection programs could be expanded to other cities/counties throughout the State. Smaller local recycling companies may be in a good position to provide flexible and tailored recycling programs for California communities.

Plastic Markets Need to Be Encouraged

Market development policies generally consist of three types – recycled content mandates, buy-recycled programs, and support for manufacturers of recycled products. California has policies and programs in place in all three areas. The recycled content requirements for plastics have been somewhat disappointing regarding their impact on plastic markets in California. Unlike the glass and newspaper recycled content laws, where materials collected in California are used in California products, much of the recycled content plastic for plastic containers is collected and made into containers out-of-state. The buy-recycled program is improving, but it could be stronger to support manufacturers of recycled plastic products. The DOC and the CIWMB assistance programs for recycled product manufacturers are strong – the Recycling Market Development Zones and loan program, operated by the CIWMB, and the extensive market development outreach and grants programs operated by the DOC, are compatible programs and both support manufacturers of recycled products. Three policies to promote plastic markets are:

- Expand, enhance, and enforce existing government recycled content purchase policies and environmentally friendly procurement programs for plastics.
- Create positive incentives for companies selling recycled plastic content products (both open- and closed-loop), such as tax credits, tax deductions, and exemption from fees. Do not use recycled content mandates for plastic products. One alternative within the beverage container program is to reduce processing payments for manufacturers of plastic beverage containers that use recycled content at, or above, a certain level, say 10 percent. Another option would be for companies to certify a content level above some established percentage, and existing California sales quantities, and receive a tax credit or deduction per ton of recycled resin used. The deduction or credit could be greater if the recycled plastics came from California. This initiative would require random audits to verify the recycled content claims.
- Develop public policies that help level the playing field for biodegradable plastics. Without government stimulation, the current price differential between petroleum-base plastics and biodegradable plastics is likely to hinder the growth of biodegradable packaging and other applications in the short-term. Research and development tax credits, or other jump-start subsidies need to be considered to help narrow this price differential. These options could include user taxes on on-degradable plastic bags and/or tax credits for biodegradable plastic bags.

Plastics Public Information, Relations, and Education

Historically, there have not been clear and consistent public education and public relation efforts to promote plastics recycling and resource conservation. Recycling education efforts usually consist of a patchwork of uncoordinated efforts between local governments, industry, the DOC, the CIWMB, and environmental education non-profit organizations. A coordinated outreach effort is essential to help boost recycling rates and reduce confusion about plastics recycling among consumers.

The chasing arrows plastics resin code system provides a false sense of recycling security for industry. Only HDPE and PET plastics are recycled with any significant frequency, yet many consumers are led to believe that any container with a chasing arrow code is recyclable. Furthermore, some manufacturers use claims of recyclability to help sell their products when in fact, the products are not recyclable. False recycling claims, or erroneous claims about recyclability on packaging, mislead consumers and hurt recycling efforts for those plastics that can truly be recycled. There is a need for clear, consistent messages on plastics recycling with an emphasis on truth-in-advertising.

The impression from much of the industry-based recycling publicity is that plastics are more recyclable than they really are. These messages are counterproductive to the broader plastic recycling movement and create confusion among consumers about what plastics are effectively recyclable. Because of these false messages, many consumers are under the impression that they should have recycling opportunities for all plastics, even when it does not make technical or economic sense. In addition, consumers become even more disenchanted when they find out that some plastic materials that are being dutifully collected are not actually being recycled.

Expanding plastics education efforts must be different than most of the past efforts to-date. There is a strong need, and an insatiable demand, for ongoing education programs to identify what is recyclable, where it can be recycled, why it should be recycled, and why plastics and other materials should not be littered. These efforts should be coordinated and extensive. A potential model is the aggressive statewide anti-smoking campaigns of the last several years. The following nine policies and programs for plastics education, public relations, and information should be pursued:

- *Increase resource conservation and recycling education coordination efforts through collaboration between state and local government, environmental groups, and industry.* Create a “Plastic Recycling Council” consisting of representatives from state and local government, industry, retailers, recyclers, environmental groups, consumer groups, educators, and public relations firms. The Council could be funded through government and public and private entities to conduct public awareness campaigns, and initiate joint industry/government outreach campaigns to increase plastics recycling and resource conservation. Innovative initiatives should be included such as lotteries or prizes for certain plastics.
- *Use additional bottle-bill surplus funds in the near term for expanded plastics beverage container recycling publicity and public education, especially on litter issues.* Continue the extensive education efforts that were initiated last year to support container expansion, especially for recyclable plastic types.
- *Identify the specific reasons that consumers are not recycling certain plastics, and identify potential barriers and problems that should be addressed in outreach efforts for different plastic types.*
- *Enforce truth-in-advertising about recyclability of plastics packaging, and other plastic packaging characteristics, such as biodegradability.* False advertising claims should be identified and forwarded by the CIWMB to the State Attorney General’s Consumer Protection and Business Information program.
- *Develop a California Curbside Label for plastic products that can be recycled in every curbside program, as a way to motivate manufacturers to increase recyclability of their packaging.*
- *Develop a “designed for recycling” seal of approval that could be awarded to plastic containers for sale in California with high levels of recyclability.* Develop an innovative plastics packaging award as part of the CIWMB’s Waste Reduction Awards Program (WRAP) for new packaging that has high recyclability, recycled content, or source reduction features.
- *Develop and publicize a list of recycled content and environmentally friendly plastic products for state and local government procurement.* In addition, publicize the list more broadly, for example to large companies and consumers.
- *Increase litter-reduction education efforts, as part of the above efforts, through collaboration between state and local government, environmentalists, retailers, and industry.* Conduct an extensive public education effort on litter, and the impacts of litter, particularly plastics litter. Identify key age and interest groups to target in the campaign, and tailor messages to those audiences. Evaluate behavioral reasons for littering, and address those issues in the campaign. Work with existing organizations, such as Keep America Beautiful (KAB), Keep California Beautiful (KCB), the California Coastal Commission, industry, retailers, environmental and community groups to promote anti-litter efforts.
- *Explore making litter a civil offense, and begin instituting litter tickets, like parking tickets.* Also, consider the concept of an environmental court for pursuing environmental crimes such as litter and solid waste violations.

Plastics Research/Development and New Technologies

There is a tremendous need to provide timely policy and program aid, legislative backing, and financial support to both emerging, and presently commercialized, plastic technologies. Advancing new plastic technologies will require significant leadership, and technical and financial assistance from both the CIWMB and the DOC. There has not been enough attention paid to advancing plastic technologies that have tremendous promise to help solve many of the State's fundamental plastic issues. The same California that bore a Silicon Valley world-class computer industry surely can lead the world in advancing state-of-the-art plastic technologies.

Plastic conversion technologies, biodegradable plastics and composting, and other new plastic recycling technologies offer much promise to help mitigate plastic environmental issues, develop new plastic end products, and increase plastic diversion from landfills. However, their actual environmental performance, cost, and impacts on existing State goals and programs have yet to be determined. Both the CIWMB and the DOC must get involved in these plastic technology initiatives, both to help lead, and to help evaluate, these efforts. The State needs to carefully evaluate and balance the impacts and effectiveness of new plastic technologies. New technologies will not solve all of our plastics problems, and in fact may create some other new problems, but technology is a critical piece of the long-term plastics solution.

New plastic technologies have tremendous implications for local government jurisdictions. Currently, many waste haulers will not generally pick up all types of plastic because there are no markets for it. If there were effective and economic plastic conversion technologies, local jurisdictions would have to be stimulated to collect all plastics, including film plastics and packaging, with the all plastics bottle at curbside campaign, giving way to a new all plastics at the curbside crusade, with a positive sort at the back end for PET and HDPE plastics. Identifying, collecting, and sorting plastics for conversion technologies and composting biodegradable plastics are significant public policy issues that must be addressed.

Future plastics technology will likely drive future plastics collection practices, and this will be particularly true on a jurisdiction specific basis as local entities begin to pilot new plastic processes. Local jurisdictions will need help with funding their future large-scale plastics collection operations so as to be able to obtain sufficient volumes of plastic materials to overcome economic scale problems. A key issue is that plastics conversion and even biodegradable plastics and composting should not replace higher-value plastics recycling. Plastic materials should only go to conversion and biodegradable plastics and composting when they cannot be recycled.

■ *Provide support for and undertake forums and workshops on plastic initiatives, including promising and significant plastic technologies, such as plastic conversion technologies, biodegradable plastics and composting, auto shredder plastics recycling, commingled/mixed plastic processors for recycled value-added products, and many others currently, and to be determined. Just as the CIWMB in the past few years spearheaded several initiatives on conversion technologies in general, it, and the DOC, now need to begin to these plastic technology initiatives, including the following examples:*

- Work with other State agencies on plastic conversion technologies, biodegradable plastics and composting, and other technology issues and form an external industry advisory group for plastic technologies and sub-technology applications.
- Plan public education workshops and symposia that focus on City and County officials, and the general public, working with private industry partners regarding specific information needs regarding plastic conversion technologies, biodegradable plastics and composting, and other new technologies that can keep plastics out of our landfills and environment.
- Develop a budget change proposal seeking General Fund support for a grant program for small-scale demonstration projects that use plastic conversion technologies, biodegradable plastics and composting, and other new plastic technologies.

- Work with the California Pollution Control Financing Authority, Technology Trade and Commerce Agency, and other applicable State agencies to ascertain existing funding availability for plastic conversion technologies, biodegradable plastics and composting, and other new plastics technologies; work with applicable Federal agencies on existing funding opportunities for California plastic technology projects.
- Work with Cal/EPA to set up a streamlined permitting process for assisting project proponents of appropriate plastic technology projects.
- *Support plastics conversion by addressing the barriers that limit further commercialization of plastic conversion technologies.* This includes technical and financial assistance with (1) financing for commercial scale plastics conversion facilities, (2) large scale plastic collection practices, (3) permitting plastic conversion and other new facilities, and (4) further statutory and/or regulatory relief, as appropriate, or required.
- *Provide government stimulation to address the current price differential between petroleum-based plastics and biodegradable plastics.* This differential is likely to hinder the growth of biodegradable packaging and other applications in the short-term. The CIWMB and the DOC need to consider ways to help narrow this price differential now, including the use of research and development tax credits or other jump-start subsidies.

A Structured Collaborative Process Needs to Begin Now to Develop Shared- Responsibility for Plastics in the State

The only way to develop effective, long-term solutions to the State's plastic issues is through a highly structured collaborative approach involving all vested parties. Stakeholders would include industry (resin, container, and product manufacturers), distributors, retailers, recyclers, processors, reclaimers, state and local governments, environmental groups (involved in solid waste, water quality, and coastal issues), consumer groups, and other interested individuals and organizations.

While the CIWMB and the DOC could try to independently develop policy solutions, mandates, or legislation for long-term policies to increase plastic recycling, resource conservation, and use of recycled plastics, the political process would likely manipulate any carefully thought out policy package that does not have broad stakeholder support, diluting the intended policy effects. It will be much more effective to have all key stakeholder parties develop, and generally agree, on an approach, and help execute it (perhaps initially with little, or no, legislative mandates). The final outcome of the collaborative process should be determined by the stakeholders. The CIWMB and DOC can begin now to draw on the momentum established through the white paper process to help initiate and formalize a collaborative process.

Initiating a Collaborative Process for Plastics Shared-Responsibility

Drawing on participants already involved in this white paper process, those working with the DOC and the CIWMB on other plastic issues, and any other interested stakeholders, develop a list of potential participants. The process should be inclusive, accepting any members that are interested in actively participating, and encouraging participation from all involved parties, particularly those that have not been as involved to-date, such as retailers. The CIWMB and the DOC should support and help facilitate this process. At a start-up meeting, the group should divide themselves into at least four task forces for (1) plastics collection and market development, (2) plastics public information, relations, and education, (3) plastics research/development and new technologies, and (4) long-term shared responsibility plastic policies and associated funding. The collaborative process could be established voluntarily, or it also could be established through legislation that would allocate funding and identify participants and a timeline.

Guidelines for a Collaborative Process for Plastics Shared-Responsibility

The task forces should meet regularly to (a) identify and develop specific goals, policies, and initiatives that will meet the State's objectives for plastics, including increasing plastics resource conservation, increasing plastics recycling, and increasing the use of recycled plastics; (b) develop and support legislation, if needed, to implement new plastic policies and programs; (c) implement plastic policies and initiatives, as appropriate; and (d) report on progress to the overall group. Each subgroup should develop specific objectives building on relevant issues, policy goals, and policies presented in this white paper. The collection and market development group may want to identify recycling rate targets for different plastic products and packaging.

The first three groups, to a greater extent, will be considering policies and initiatives that are somewhat less controversial, and that could be implemented in the near-term. The fourth group will be considering more controversial policy options, and on a longer timeframe. This fourth group, in particular, should take care to acknowledge the input of all participants, and all subgroups.

Plastic Policy Options for a Collaborative Process to Consider

Some of the policies discussed in this white paper could serve as a guide for the first three task force groups. Most all of the future plastic policies require some funding. Although some initiatives can be funded from existing sources, there still will need to be new sources of funding for many of the initiatives. The long-term policy group should discuss and consider a range of alternatives that could generate funds to support adopted policies, as well as new future initiatives.

Policies should attempt to internalize plastic's externalities, while recognizing the many benefits of plastics. Any new policies that require someone to pay are inherently controversial, especially in a time of economic recession. However, postponing the plastics issue is irresponsible, and is likely to result in greater total costs in the long-term. The ultimate plastic policies that are most likely to be successful will be those that share costs between all responsible parties and provide a mix of alternatives.

The final result of the collaborative process would be implementation of a new set of policies and programs that optimize the use, recycling, and disposal of plastics in California. The process itself should also result in better working relationships between various plastic stakeholders, enabling them to identify and implement mutually beneficial initiatives of their own, if possible.

Should Landfill Tipping Fees Be Increased in the State?

Landfill tipping fees in California are relatively low - averaging approximately \$35 per ton in 2000. With such a low cost, it is often easier and more economical to simply throw plastics away. A higher tipping fee would create greater incentives to recycle, or otherwise divert plastics, as well as other materials. Higher tipping fees also would generate additional revenues that could be used to support new plastic programs and policies.

One drawback of this policy option is that raising the fee to a high enough level to create an effective incentive to increase plastics diversion is likely to be politically unacceptable. A lower fee increase would be more politically acceptable, but such a lower fee would not create enough incentives to change behavior, but would rather generate funding.

Increasing the landfill tipping fee places the burden of increased fees on the consumer, hauler, and local government. Increasing tipping fees may be considered as part of any plastics funding package, however it should be recognized that there still will not likely be an adequate pricing signal passed through to manufacturers to reduce wastes with a probable landfill tipping fee increase.

Should Plastic Manufacturers Be Assessed Additional Plastic Payments?

Some members of the plastics industry have already made significant contributions to plastics recycling in California. There is still an opportunity for industry to provide increased funding support, especially as part of a broad collaborative initiative that is likely to be more successful than the independent, and more discreet industry efforts undertaken in the past.

There are many possible options by which industry could expand their support of plastics initiatives. These include: funding specific earmarked programs, voluntary deposit systems (payment of an amount to be determined) paid into a plastics fund based on sales in California, or mandatory fees or deposits. Mandatory fees will be unpopular among industry groups and complicated to implement for both government and industry. However, it is possible to develop fee systems that would be fair and acceptable.

Mandatory deposits could be complicated, unless blended into the existing bottle bill system. There may be some products or packages for which a voluntary deposit system is appropriate. These systems should be pursued by those industries. Two examples of potential voluntary deposits are the Alberta Dairy Council Plastic Milk Container Recycling Program, and deposits on car batteries to encourage returns to the retailer. Industry groups may also choose to self-fund initiatives for their products and packaging, such as the Plastic Loosefill Council's recycling program for packaging peanuts. These programs all provide funding, however, for fairly specific products and packaging.

For more generalized industry support of plastics recycling and resource conservation, one alternative would be to establish a payment based on sales of plastic goods in California, which would then be used to fund new plastic policy initiatives. Like the National Packaging Covenant in Australia and New Zealand, the fees could be based on sales, and could be supplemented by State funding. The task forces could develop specific criteria for uses of the funds. Companies could choose to contribute to the fund voluntarily, or the fee could be mandatory. This type of fee would be much simpler to implement than an advanced disposal fee on individual products or packages sold in the State.

The State Needs Smart Plastic Policies

The agenda for future California plastic policies and programs should be one of "smart policies" that entail true collaboration with industry in order to establish a policy framework for optimizing and managing the State's entire plastics stream, from production and use, through recycling and the use of appropriate technologies, and finally disposal. Smart policies would set aside proforma-business and environmental positions, and let the collaborative process follow scientific data and analyses, and good public policy concerning plastics, wherever that may lead. In managing plastics, industry should learn to speak the vocabulary of consumer and environmental benefits and protection.

Smart plastic policies would consider helping level the secondary/virgin and recyclable/non-recyclable material playing field so as to reflect the true and full costs of plastic materials through their entire lifecycle. Market forces can slowly change plastic public policies, but smart plastic policies can help catalyze the development of breakthrough plastic technologies so as to quickly gain their environmental benefits for the State.

Smart policy plastic stakeholder collaborations should entail more-thoughtful arguments that go beyond simple questions of cost to industry and consumers, but also acknowledge quantifiable and non-quantifiable costs and benefits to the State at large. Also, smart policies should meet standards for balancing costs and benefits, and should include other factors such as fairness, lifestyle, and impacts on smaller companies.

Smart policies would acknowledge the inevitability of change from our current, ineffective status quo plastic policies, and focus more on helping to develop new and better policies and programs to manage plastics. Smart plastic policy efforts would spend less time and money on whether we need new plastic policies in California, and more resources spent on what the new policies would be, and how they would work.

Summary of Plastic Policy Options

Policies and Programs	Lead Agency	Time Frame	Ease of Implementation	Cost	Increase Recycling	Increase Resource Conservation	Increase Use of Recycled Plastic	Requires Legislation
Modifications to Existing Laws								
1. Address AB 939 Incentives	CIWMB	Medium	Moderate	Moderate	Direct	Direct	Indirect	Possible
2. Legislate Changes in AB 939 Definitions	Legislature	Medium	Moderate	Low	Indirect	Indirect	Direct	Yes
3. Promote RPPC Recycling Rate	CIWMB	Medium	Moderate	Moderate	Direct	Direct	Indirect	No
4. Streamline RPPC Law	CIWMB	Medium	Difficult	Low	Indirect	Indirect	Indirect	Yes
5. Replace RPPC Law with New Initiatives	All	Long	Difficult	Low	Indirect	Indirect	Indirect	Yes
6. Redirect RPPC Staff	CIWMB	Long	Easy	Low	Indirect	Indirect	Indirect	Yes
7. Work with DGS for Trash Bag Procurement	CIWMB	Short	Easy	Low	Neutral	Indirect	Indirect	No
8. Replace the Trash Bag Law with New Initiatives	All	Medium	Moderate	Low	Neutral	Neutral	Neutral	Yes
9. Redirect Trash Bag Staff	CIWMB	Medium	Easy	Low	Indirect	Indirect	Indirect	Yes
10. Implement Commingled Rate for mixed #2 to #7	DOC	Short	Moderate	Low	Indirect	Indirect	Indirect	No
11. Legislate Plastic Incentive Payments	Legislature/DOC	Short	Moderate	Moderate	Direct	Direct	Indirect	Yes
12. Modify Plastic Processing Fee	Legislature/DOC	Short	Moderate	Moderate	Indirect	Indirect	Indirect	Yes
13. Recalculate Processing Fee in 2003	DOC	Medium	Moderate	Moderate	Indirect	Indirect	Indirect	No
14. Conduct DOC Litter Study	DOC	Medium	Moderate	Moderate	Neutral	Neutral	Neutral	No
15. Increase Market Development Support for Plastics	Legislature/DOC	Medium	Moderate	High	Direct	Direct	Direct	Yes
16. Apply AB 2020 Plastic Surplus to Support Plastic Beverage Container Recycling	Legislature	Medium	Moderate	Low	Direct	Direct	Indirect	Yes
17. Reevaluate AB 2020 Plastics in 2005	DOC	Long	Moderate	Moderate	Neutral	Neutral	Neutral	No
Collection and Market Development								
1. Support for Collection and Processing	All	Medium	Moderate	High	Direct	Direct	Direct	No
2. Develop and Publicize Collection and Processing Best Practices	CIWMB/ Industry Groups	Short	Easy	Low	Indirect	Indirect	Indirect	No
3. Implement Loans/Grants for Equipment	CIWMB/DOC	Medium	Moderate	Moderate	Direct	Direct	Direct	Yes
4. Develop and Publicize Plastic Quality Standards	CIWMB/ Industry Groups	Medium	Easy	Low	Indirect	Indirect	Indirect	No
5. Implement New Location Collection Programs	DOC	Short	Moderate	Moderate	Direct	Direct	Indirect	No
6. Support for Processing Agricultural Film	CIWMB	Short/Medium	Moderate	Moderate	Direct	Direct	Direct	No
7. Support for Film Collection from Small/Medium Sized Commercial Generators	CIWMB	Short/Medium	Moderate	Moderate	Direct	Direct	Direct	No
8. Expand Buy Recycled, Procurement Programs	CIWMB/DOC	Short	Moderate	Low	Indirect	Direct	Direct	No
9. Implement Positive Incentives for Recycled Content (Open- and Closed-Loop)	CIWMB	Medium	Moderate	Low	Indirect	Direct	Direct	Yes
Public Information, Relations, Education								
1. Initiate Plastics Recycling Council	All	Medium	Moderate	High	Indirect	Indirect	Indirect	No
2. Conduct Aggressive Advertising Campaign	CIWMB/DOC	Medium	Moderate	High	Indirect	Indirect	Indirect	Possible
3. Apply AB 2020 Surplus for Education	Legislature/DOC	Medium	Easy	High	Indirect	Indirect	Indirect	Yes
4. Identify Barriers to Recycling	CIWMB/DOC	Medium	Moderate	Low	Indirect	Indirect	Neutral	No
5. Enforce Truth in Advertising	CIWMB	Medium	Moderate	Moderate	Indirect	Indirect	Indirect	No
7. Establish California Curbside Label	CIWMB/DOC	Medium	Moderate	Moderate	Indirect	Indirect	Neutral	Possible
8. Implement Design for Recycling Approval, Awards	CIWMB	Medium	Moderate	Low	Indirect	Indirect	Indirect	No
9. Develop and Publicize List of Recycled Content, Positive Products	CIWMB	Medium	Moderate	Low	Indirect	Indirect	Indirect	No
10. Increase Litter Education	CIWMB/DOC	Medium	Moderate	High	Neutral	Indirect	Neutral	Possible
11. Enforce Litter Violations	CIWMB/DOC	Medium	Difficult	High	Neutral	Indirect	Neutral	Yes
12. Promote Research and Unbiased Information Sharing on Plastics Health Impacts	CIWMB	Medium	Easy	Moderate	Neutral	Indirect	Neutral	No
Research/Development and New Technologies								
1. Provide Technical Support for New Technologies	CIWMB/DOC	Medium	Moderate	Moderate	Direct	Direct	Indirect	Possible
2. Provide Financial Support for New Technologies	CIWMB/DOC	Medium	Moderate	High	Direct	Direct	Direct	Yes
3. Evaluate New Technologies	CIWMB/DOC	Short	Easy	Low	Indirect	Indirect	Indirect	No
4. Support Collection for New Technologies	CIWMB/DOC	Medium	Moderate	High	Direct	Direct	Direct	No
5. Support Conversion Technologies	CIWMB	Short	Easy	Moderate	Direct	Direct	Direct	Possible
6. Implement Government Stimulation for Biodegradables	CIWMB	Medium	Moderate	Moderate	Neutral	Direct	Neutral	Yes
7. Conduct Forums and Workshops for New Technologies	CIWMB	Medium	Moderate	Moderate	Indirect	Indirect	Indirect	No
8. Work with Agencies and Industry Advisors to Support Technologies	CIWMB/DOC	Medium	Moderate	Low	Indirect	Indirect	Indirect	No
9. Conduct Technology Education Symposia for Cities and Counties	CIWMB/DOC	Medium	Moderate	Moderate	Indirect	Indirect	Indirect	No
10. Establish Grant Program for Demonstration Projects	CIWMB	Medium	Moderate	Moderate	Direct	Direct	Direct	Yes
11. Work with CPCFA, TCA to Fund Technologies	CIWMB	Short	Easy	Low	Direct	Direct	Direct	No
12. Streamline Permitting with Cal/EPA	CIWMB	Short	Moderate	Low	Indirect	Indirect	Indirect	No
Structured Collaborative Process								
1. Initiate a Collaborative Process	CIWMB/DOC	Short	Moderate	Moderate	Indirect	Indirect	Indirect	No/Possible
2. Form Task Forces and Guidelines	All	Medium	Moderate	Low	Indirect	Indirect	Indirect	No
3. Conduct Task Force Meetings and Policy Development	All	Medium/Long	Difficult	Moderate	Indirect	Indirect	Indirect	No
4. Conduct an International Symposium	CIWMB/DOC	Medium	Moderate	Moderate	Indirect	Indirect	Indirect	No
5. Develop and Implement Long-Term Policies	All	Long	Difficult	High	Direct	Direct	Direct	Possible
6. Develop Measurement Methods and Credits for Source Reduction	CIWMB	Medium	Moderate	Low	Neutral	Direct	Neutral	No
7. Implement Privately Operated Non-Profit Plastics Consortium	Industry Groups	Medium/Long	Moderate	Moderate	Indirect	Indirect	Indirect	No
Funding Mechanisms – Long-Term Policies								
1. Increase Landfill Tipping Fees	CIWMB	Long	Difficult	Moderate	Indirect	Indirect	Indirect	Yes
2. Implement Voluntary Deposit or Fee Systems	Industry Groups	Long	Moderate	Moderate	Direct	Direct	Direct	No
3. Implement Mandatory Deposit or Fee Systems	DOC/CIWMB	Long	Difficult	Moderate	Direct	Direct	Direct	Yes
4. Implement Mandatory Industry Funding Based on Sales	CIWMB/DOC	Long	Difficult	Moderate/ High	Indirect	Indirect	Indirect	Yes
5. Implement Voluntary Industry Funding Based on Sales	Industry Groups	Long	Moderate	Moderate/ High	Indirect	Indirect	Indirect	No
6. Establish Taxes on Virgin Materials/Non-biodegradable Products	CIWMB	Long	Difficult	High	Indirect	Indirect	Direct	Yes

Key to responses:

Lead Agency: All refers to state agencies, legislature, industry, and environmental groups

Time Frame (to initiate program): Short is less than 1 year, Medium is 1-2 years, Long is over 2 years

Ease of implementation: Easy can be done in-house, Moderate requires more significant shifting of staff and/or resources, High requires significant change within agencies or stakeholder groups

Costs (overall expected costs): Low is relatively inexpensive, within existing budgets, Moderate requires some additional budget, High requires significant new funding from one or more sources

Goals: Direct means policy would lead to a direct increase in goal, Indirect means policy would indirectly improve the goal, and Neutral would have no impact

Requires Legislation: Possible means that policy could be done without legislation, but a legislative effort might be beneficial

A Suggested California International Symposium for Plastics

To continue the process initiated by this white paper, and further the development of plastic technologies, plastic issues, and future plastic policies, the CIWMB and DOC, in coordination with other interested organizations, could host an International Symposium (tentatively titled: New Technologies and Smart Policies for Optimizing Plastics Use) during 2003. This Symposium would showcase new and emerging, plastic technologies and policies from around the world and further develop California plastic issues and potential solutions. Efforts from this Symposium would continue through four (or more) ongoing subcommittees to further the optimization of plastics use in California. These four working subgroups would be (1) plastics collection and market development, (2) plastics public information, relations, and education, (3) plastics research/development and new technologies, and (4) plastics product stewardship and shared financial responsibility.

California's long-term plastics management solution should not simply be another "band-aid" repair of our current plastic laws. The solution to California's plastic issues will be a new model, unique to our State, much like the AB 2020 bottle bill and the AB 939 integrated waste management system were over a dozen years ago. The likely California plastics solution will entail a "clean sheet of paper" approach, or a "day one concept", rather than additional focused improvements to our existing plastic institutions. California has the opportunity to be a leader in plastics management, not only among the other states and the federal government, but internationally as well.

There is the need to continue the three-way dialogue of government, industry, and environmentalists that began with this plastics white paper project concerning difficult and often contentious plastic issues. The collaborative process will not be easy, and it likely will take several years to develop, and ultimately implement, effective and long-term plastic policies for California. It is hoped that this plastics white paper initiative is the beginning, and not the end, of a fruitful dialogue and collaboration of all interested plastic stakeholders to seek new solutions for California's plastic challenges.

There is an Opportunity for Industry to Help Initiate Plastic Solutions

California's long-term plastics solutions need not be legislatively mandated or even government directed. There are numerous examples internationally of industry-led initiatives that in which a private consortium organizes a collection and funding effort. In some cases such as British Columbia, Canada's household hazardous waste programs, and Manitoba, Canada's product stewardship system, industry is given a legislative mandate to meet a certain goal, and is given the leeway to choose the approach. In other cases, such as Alberta, Canada's milk container recovery system, and New Zealand and Australia's packaging covenant, industry has taken the initiative upon themselves, sometimes as a way to avoid legislative mandates that may be more onerous.

These privatized initiatives provide a potential model for California's efforts to optimize plastics use, recycling, and disposal. Typically, an organizing board is established that includes government, industry, and environmental representatives. Industry would develop collection, recycling, or other programs, and establish a membership fee or other funding mechanism to support those programs. A privately established system has the advantage of increased flexibility, lower administrative costs, and it allows industry greater control over the types of programs that are funded. Such a system would also provide an ongoing forum to discuss and promote plastics initiatives among interested stakeholders.

The four suggested plastic task forces of this white paper could be organized under a private, nonprofit corporation that is comprised of a board of directors with nine, or more, members. The board seats could include (1) state government, (2) local government, (3) environmentalists, (4) retailers/consumers, (5) resin manufacturers, (6) container manufacturers, (7) packaging manufacturers, (8) product manufacturers, and (9) recyclers/processors. Each board seat could provide funding to the nonprofit corporation in relation to the board's seat representation.

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The 1960's Bit of Advice Proved Visionary

In the 1960's film, *The Graduate*, the aimless collegiate, Ben, contemplating his future, is soberly informed by a meddling family friend:

"Ben – I want to say one word to you – just one word – 'plastics'."*

* Calder Willingham penned these words in the 1967 screenplay.

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Both Jim and Wendy have frequently been regarded as a rambunctious lot, questioning environmental laissez-faire doctrines, getting into the hair of lawyers and political scientists, intruding into the precincts of the physical scientists, and generally disturbing the peace of economic interests.

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